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Bibliography of Small Wastewater Flows, 1984

West Virginia Univ., Morgantown

Prepared for

Municipal Environmental Research Lab.
Cincinnati, OH

Nov 84

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November 1984

1984 BIBLIOGRAPHY OF SMALL WASTEWATER FLOWS

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Grant No. CR 809297

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16. ABSTRACT

This publication contains abstracts of literature related to innovative and alternative wastewater treatment systems for small communities, and individual, on-site systems.

This is the second bibliographic volume. This new volume supplements the first volume. The 1984 volume contains information abstracts that have been added to the clearinghouse database since the publication of the 1979 Bibliography. The indexes in this volume catalog the information contained in both the 1979 and 1984 documents and can therefore be used to search both for the pertinent entries. However, the first 531 entries are included in the first volume only.

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Foreword

The Environmental Protection Agency was created because of increasing public and government concern about the dangers of pollution to the health and welfare of the American people. Noxious air, foul water, and spoiled land are tragic testimony to the deterioration of our natural environment. The complexity of that environment and the interplay between its components require a concentrated and integrated attack on the problem.

Research and development is that necessary first step in problem solution and it involves defining the problem, measuring its impact, and searching for solutions. The Municipal Environmental Research Laboratory develops new and improved technology and systems for the prevention, treatment, and management of wastewater and solid and hazardous waste pollutant discharges from municipal and community sources, for the preservation and treatment of public drinking water supplies, and for minimizing the adverse economic, social, health, and aesthetic effects of pollution. This publication is one of the products of that research; a most vital communications link between the researcher and the user community.

This publication contains abstracts of literature related to innovative and alternative wastewater treatment systems for small communities, the sparsely populated areas of larger communities, and individual, on-site systems. This new bibliography volume supplements the first volume, The 1979 Bibliography of Small Wastewater Flows.

Francis T. Mayo, Director
Municipal Environmental
Research Laboratory

Preface

This publication contains abstracts and indexes of domestic and foreign literature dealing with alternative treatment and collection systems as searched by the professional staff of the EPA National Small Wastewater Flows Clearinghouse (SWF). Both technical and nontechnical reports and information are included.

The subject matter researched includes innovative and alternative wastewater treatment systems for small communities, the sparsely populated areas of larger communities, and individual onsite systems.

This bibliography contains information that is applicable to:

* septic tanks and subsurface disposal systems
* other onsite systems, including dual systems
* small systems serving clusters consisting of a small number of households or commercial users, each user with average annual dry weather flows of under 25,000 gallons per day
* six-inch and smaller gravity sewers carrying partially or fully treated wastewater or carrying raw wastewater as part of limited conveyance systems which serve clusters of households and small commercial establishments
* pressure and vacuum sewers
* other treatment or conveyance works that employ alternative technologies and that serve communities with sparsely populated areas of larger communities

This is the second bibliographic volume published by the Clearinghouse. This new volume supplements the first volume, **The 1979 Bibliography of Small Wastewater Flows.** The 1984 volume contains information that has been added to the Clearinghouse data base since the publication of the 1979 Bibliography. The indexes in this volume catalog the information contained in both the 1979 and 1984 documents and can therefore be used to search both for the pertinent entries. However, the first 531 entries are listed in the first volume only.

Abstract

The USEPA National Small Flows Clearinghouse maintains a computer database which contains abstracts and indexes of domestic and foreign literature dealing with innovative and alternative wastewater treatment systems for small communities, the sparsely populated areas of larger communities, and individual onsite systems. Both technical and nontechnical reports and information are included.

The database contains information that is applicable to: septic tanks and subsurface disposal systems; other onsite systems, including dual systems; small systems serving clusters of households or commercial users, each user with average annual dry weather flows of under 25,000 gallons per day; six-inch and smaller gravity sewers carrying partially or fully treated wastewater or carrying raw wastewater as part of limited conveyance systems which serve clusters of households and small commercial establishments; pressure and vacuum sewers; and other treatment and conveyance works that employ alternative technologies and that serve communities with sparsely populated areas of larger communities.

This is the second bibliographic volume. This new volume supplements the first volume, the 1979 Bibliography of Small Wastewater Flows. The 1984 volume contains information abstracts that have been added to the Clearinghouse database since the publication of the 1979 Bibliography. The indexes in this volume catalog the information contained in both the 1979 and 1984 documents and can therefore be used to search both for the pertinent entries. However, the first 531 entries are included in the first volume only.

The database may also be searched by computer using descriptor words, taxanomic designations, states' names, and/or authors' names. People interested in having a search of the database performed for them can call the Clearinghouse at its toll-free number (800)624-8301.

This report was submitted in fulfillment of Grant Number CR 809297 by West Virginia University under the partial sponsorship of the U.S. Environmental Protection Agency. This report covers the period from June 1981 to March 1984, and work was completed as of August 1984.

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Acknowledgments

The contents of this publication were prepared under a grant (CR-809297-01-0) funded by the Environmental Protection Agency under the authority of and as provided by the 1977 Clean Water Act.

This volume was compiled, edited, and published through the combined efforts of the EPA Municipal Environmental Research Laboratory, Cincinnati, Ohio, and the EPA National Small Flows Clearinghouse, Morgantown, West Virginia. Since the formation of the Clearinghouse, the goal has been to assemble a data base to assist all persons concerned with small wastewater flows.

The following people helped produce the 1984 volume of the Bibliography of Small Wastewater Flows:

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Section I

HOW TO USE THE COMPILATION

Each abstract is listed by accession number in the section called Abstract Listing. The sample abstract below illustrates how to locate items in the abstract listing.

```
1 & 2 ->  ACC#   :  L000001 *
    3 ->  AUTHOR:  Fripp, J.L., Jr.
    4 ->  AFFIL :  Georgia Department of Transportation, Atlanta, GA
    5 ->  TITLE :  Centralized Management of Small Plants
    6 ->  SOURCE:  National Conference on Less Costly Wastewater
                   Treatment Systems for Small Communities; 1977;
                   pp. 77-79 (EPA-600/9-79-010; NTIS Report No. PB
                   293 254/AS)
    7 ->  COST  :  $6.50
    8 ->  YEAR  :  1978
    9 ->  TEXT  :  Describes Georgia's system of dealing with safety
                   rest area wastewater treatment plants. Plants
                   are septic tanks, activated sludge followed by
                   secondary treatment by polishing ponds, and
                   activated sludge followed by rapid sand
                   filtration. Presents the major topics considered
                   in constructing and successfully operating small
                   treatment plants. (SWF)
   10 ->  CON   :  NTIS
                   5285 Port Royal Road
                   Springfield, VA 22161
```

1. Small Wastewater Flows' data base accession number: an identification number assigned to documents as they are processed. The accession number refers to the Abstract Listing entry where the complete bibliographic information, the abstract of the document, and the availability of the information can be found.

2. * indicates that the document is reported by the National Technical Information Service (NTIS) as being available, but a copy is not available at the Clearinghouse. Accession numbers without asterisks indicates that a copy of the publication is stored at the Clearinghouse.

3. Name(s) of the author(s).

4. Affiliation(s) of the author(s) as indicated in the publication.

5. Title of the publication.

6. Source of the publication (book, journal, report, proceedings), publisher and number of pages.

7. NTIS's price. Only some of the entries contain this information. Note, however, that actual prices may vary from those published.

8. Date published.

9. The publication's abstract, which was written by the author (AU), Clearinghouse engineers (SWF), or by both (AU/SWF).

10. Agency or person from whom the document may be obtained.

The *1984 Bibliography of Small Wastewater Flows* contains bibliographic entries 532 through 1576 and supplements the *1979 Bibliography of Small Wastewater Flows* which contains entries 1 through 531. Indexes for all entries from 1 through 1576 are included in the new, 1984 bibliography.

Section II

HOW TO USE THE INDEXES

This bibliography contains five indexes which can be used to identify those articles of interest. The indexes are:

AUTHOR INDEX...

lists each author in the data base along with the accession numbers for the bibliographic information and abstract for the articles published by him or her.

DESCRIPTOR INDEX...

uses key words to categorize the small flows technologies, the characteristics of various treatment systems, and the characteristics of management systems. Use this index alone or with the Taxonomy Index to narrow the number of references to those specifically of interest.

STATE INDEX...

arranged alphabetically, use this index to find entries which contain information directly related to a particular state.

TAXONOMY INDEX...

use this index to search for information in either a general or a specific subject area. An accession number is included for each document under the subject heading.

TITLE INDEX...

arranged according to accession number, use this index for easy cross-reference from the numbers in the other indexes.

To ensure that you have performed a thorough search for a chosen topic, it is best to use at least two search methods. Due to the difficulty in consistently and objectively assigning key words and taxonomy numbers, do not rely on one method or one index alone to yield all the information available in the data base for a particular topic. For example, the key word "composting toilet" cites 58 articles while the taxonomy for composting toilets (1.2.3.1) cites 53 articles, and the keyword "toilet" cites 50 articles while the taxonomy numbers for toilets (1.2.3, 1.2.3.1, 1.2.3.2, 1.2.3.3, 1.2.3.4, and 1.2.3.5) cite a total of about 30 articles when duplicate accession numbers are omitted.

EXAMPLE

Some prospective home owners are interested in learning how expensive it is to keep up a septic tank system, so they have decided to use the Bibliography to gather information.

Going to the taxonomy index first, they look for a topic related to septic tanks. In this case, there is a topic under Treatment Processes called Septic Tanks at taxonomy number 3.1.7.1. This number has 41 entries.

Next the searchers refer to the Descriptor index to look for the key word "expense." They do not find "expense" but they do see that the synonym "cost" is listed instead, where 161 accession numbers are given.

Comparing the 41 accession numbers found at 3.1.7.1 (septic tanks) against the 161 numbers for "cost," the searchers find 6 entries which exist in both lists: L000544, L000663, L000687, L000826, L000837, and L001049. However, these articles may discuss the cost of septic tanks but not necessarily the cost of maintaining septic tanks. By checking the entries under the descriptor word "maintenance," the prospective home owners discover that two of the six publications, L000687 and L001049, cover the cost of maintaining septic tank systems.

To ensure themselves that they've found all the information they want on their topic, the searchers perform a second search. They start by rephrasing their topic to be COST of MAINTAINing SEPTIC TANKS. This time, they use only the Descriptor Index.

Starting with the descriptor word "septic tank," the searchers compare the 259 accession numbers found at "septic tank" with the 68 numbers found under the descriptor word "maintenance." From this comparison, they discover that 34 numbers match, indicating that 34 articles may discuss both maintenance and septic tanks. By comparing these 34 accession numbers with the 161 numbers at the descriptor word "cost," the searchers find that 8 accession numbers match, L000200, L000523, L000558, L000604, L000616, L000652, L000687, and L001049, each one being referenced by all three descriptor words.

Checking this second list against the first one, the searchers note that both of the numbers in the former list are also in the latter one.

Since there are only eight abstracts which might be of interest to them, the searchers decide not to refer to the TITLE INDEX before going to the abstract listing. Had there been more accession numbers for this topic, the searchers may have found it beneficial to narrow down the number of publications by using the Title Index to further discern which documents would be of the most interest according to their titles only.

SECTION III

ABSTRACT LISTING

ACC# : L000532
AUTHOR: Board on Science and Technology for International Development
AFFIL : Commission on International Relations, National Research Council, for the Office of Science and Technology, Bureau for Technical Assistance, Agency for International Development, Washington, D.C.
TITLE : Making Aquatic Weeds Useful: Some Perspectives for Developing Countries
SOURCE: National Academy of Sciences, 94 p.
YEAR : 1976
TEXT : Report examines methods for controlling aquatic weeds and using them to their best advantage. Methods showing promise for less-developed countries include: techniques for converting weeds for feed, food, fertilizer and energy production. Includes discussion of procedures for use of herbivors to convert vegetation directly to meat, harvest and use of aquatic weeds in the paper industry, and other means of dealing with wastewater treatment with views toward food production and utilization of indigenous resources. (SWF)

ACC# : L000533
AUTHOR: Ettsvold, W.L.
AFFIL : Director of Environmental Health, Kent County Health Dept., Grand Rapids, MI 49508
TITLE : On-Site Wastewater Treatment Versus Collector Sewers
SOURCE: Journal of Environmental Health, Volume 41(6), p. 321-323
YEAR : 1979
TEXT : Considers the issue of developing alternative on-site sewage disposal systems in preference to collector sewers. Some of the problems and costs that must be considered in making comparisons for a 20 year planning period are presented. Population concentration, cost, and ground water conditions are cited as reasons why collector sewers are frequently the system recommended to solve pollution problems. (AU)

ACC# : L000534
AUTHOR: Lomax, K.M.
AFFIL : University of Maryland, Center for Environmental and Estuarine Studies, Cambridge, Maryland 21613
TITLE : Evapotranspiration Method Works for Wastewater Disposal Along Chesapeake Bay
SOURCE: Journal of Environmental Health, Volume 41(6), p. 324-328
YEAR : 1979
TEXT : Evapotranspiration (ET) systems, with and without plastic lined beds, installed at home sites on the laboratory campus were evaluated for public health criteria and monitored to obtain sizing information. Observations and measurements indicated that ET beds are firm and dry on the surface and without odor. Design recommendations emphasize the need for a flat bottom and firm foundation for the bed. Vegetation must be healthy throughout the year to provide sufficient transpiration capacity. Beds without a liner did not provide enough moisture for the grass in the warmer months. For a grass covered bed in the Chesapeake Bay area a sizing value of 3.5 mm per day (0.08 gpd per square foot of bed) is substantiated for total evapotranspiration of home wastewater. (AU)

ACC# : L000535
AUTHOR: Karlin, Barry
AFFIL : Sanitation Advisor, USOM
TITLE : Thailand's Water-Seal Privy Program
SOURCE: USOM/Korat, Thailand, 26 p.
YEAR : 1961
TEXT : Report describes Thailand's water-seal privy program. The water-seal privy consists of concrete bowl attached to an inverted P-shaped trap. The trap is filled with water to form a water seal. Directions and diagrams on construction of a water-seal privy are provided. (SWF)

ACC# : L000536
AUTHOR: Henning, M.P.
AFFIL : Environmental Health Program, Bowling Green State University, 901 Beach Road, Huron, Ohio
TITLE : Evapotranspiration of Wastewater Effluent
SOURCE: Environmental Health Program, Bowling Green State University, 901 Beach Road, Huron, Ohio, 13 p.
YEAR : 1977
TEXT : The parameters that control evapotranspiration of aerobic home wastewater treatment effluent were determined and evaluated. Results from the field observation and laboratory analysis showed that perferred vegetation for these systems are alfalfa (long roots increase wintertime evaporation) and four foot Scotch or Australian Pines; the capacity

(quantitative) was found to be 9 to 10 gallons per linear foot of mound per day. Dosing may be by gravity or mechanical means and groundwater interference can be precluded by a plastic underliner. A recommended evapotranspiration system design is illustrated. (SWF)

ACC# : L000537
AUTHOR: Smith, D.L.O.
AFFIL : Iowa State University
TITLE : A Laboratory Evaluation of the Sewage Osmosis Concept
SOURCE: Iowa State University, Ames, Iowa; 54 p.
YEAR : 1978
TEXT : This master's thesis sought to verify a licensee's claim that sewage could be treated by establishing an electrical potential whereby sewage would be electrolyzed into hydrogen and oxygen gas or vaporized. Mineral rock was used as an anode and a coke/graphite complex served as cathode to generate electrical potential in the trench. Research conclusions from a laboratory model showed that there was not enough potential (34mV) to either electrolyze or vaporize the sewage. An energy requirements assessment showed that at least 35.5 KW per person would be required for this purpose. It is further stated that the potential of 1V claimed to be available in the system is less than the minimum 1.7 V that would be required for electrolysis of water. Hydraulic conductivity measurements revealed that there was a steady drop of conductivity in the soil over time regardless of the mineral rock or carbon portions added. (SWF)

ACC# : L000538
AUTHOR: N/A
AFFIL : Arizona Dept. of Health Services
TITLE : Guidelines for Installation of Septic Tank Systems
SOURCE: Arizona Dept. of Health Services, State Health Bldg., 1740 West Adam Street, Phoenix, Arizona 85007; 19 p.
YEAR : 1976
TEXT : Aricle explains the guidelines for the design, construction and installation of septic tanks, disposal trenches and disposal pits in Arizona. Diagrams of these systems are included. Site suitability is determined by soil conditions, borings, and percolation test. (SWF)

ACC# : L000539
AUTHOR: N/A
AFFIL : Arizona State Department of Health Services
TITLE : Guidelines for Approval of Subdivisions with Individual Sewage Disposal Systems
SOURCE: Arizona State Department of Health Services, State Health Bldg., 1740 West Adams Street, Phoenix, Arizona 85007; 18 p.
YEAR : 1979
TEXT : Details the guidelines for permit issuance or approval for individual sewage disposal systems in Arizona. Factors considered for approval are lot size, slope, depth to groundwater table, soil profiles, percolation test results and boring logs. Historical data of surrounding properties with regard to their on-site system performance are also considered. Sample applications forms for sanitary facilities approval are included. (SWF)

ACC# : L000540
AUTHOR: N/A
AFFIL : Project CLEAR 1978, University of Michigan Biological Station
TITLE : Septic System Maintenance Programs
SOURCE: Project CLEAR 1978, University of Michigan Biological Station; 2 p.
TEXT : This pamphlet briefly describes the use of a community septic system maintenance program as a means of limiting pollution from diffuse sources. These programs increase public awareness and can save homeowners repair costs, time and energy. (SWF)

ACC# : L000541
AUTHOR: N/A
AFFIL : Department of Environmental Resources, Bureau of Community Environmental Control, Pennsylvania
TITLE : Helpful Hints on On-Site Sewage Disposal Systems Construction, Operation and Maintenance
SOURCE: Department of Environmental Resources, Bureau of Community Environmental Control, PA, 6 p.
TEXT : Pamphlet with tips for the homeowner and potential homeowner about on-site sewage disposal systems. The most common on-site domestic wastewater systems are discussed as to their purpose and causes of malfunction. (SWF)

ACC# : L000542
AUTHOR: Scheurman, P.R.; Bitton, G.; Overman, A.R.; Gifford, G.E.
AFFIL : University of Florida at Gainesville, Dept. of Environmental Engineering
TITLE : Transport of Viruses Through Organic Soils and Sediments
SOURCE: Journal of Environmental Engineering Division (ASCE), Volume 105(EE4), August, 1979, p. 629-641
YEAR : 1979
TEXT : A black organic sediment (15.5 percent organic carbon) retained only 60 percent and 75 percent of the virus suspended in secondary effluent and groundwater, respectively. When some of the water-soluble "humic materials" were leached from the sediment, the sorptive capacity was increased. Further investigation of the interfering capacity of these humic substances revealed that they interfered significantly with the adsorption capacity of poliovirus to a sandy soil. The addition of calcium chloride to humic solutions was shown to restore the sorptive capacity of the soil. Molecular weight fractionation by ultrafiltration showed that the decrease in virus adsorption was due to fractions with a molecular weight below 50,000. An organic muck soil (45.4 percent organic carbon) was found to retain 92 percent and 82 percent of the applied virus suspended in ground water and sewage effluent, respectively. It was concluded that organic soils are not particularly suitable for the application of sewage effluent. (AU)

ACC# : L000543
AUTHOR: N/A
AFFIL : N/A
TITLE : Wastewater Reclamation: A Guide for Local Agencies
SOURCE: State Water Resources Control Board, Office of Water Recycling, P.O. Box 100, Sacramento, California 95801, 13 p.
TEXT : Article provides basic facts about wastewater reclamation and gives information for setting up community wastewater reclamation programs. Appendix included guidelines for various uses of reclaimed water. (SWF)

ACC# : L000544
AUTHOR: Chestnut, T.
AFFIL : Illinois Dept. of Public Health
TITLE : Design and Construction Costs of Sand Filter Installations in Central Illinois
SOURCE: Second Annual Illinois Private Sewage Disposal Symposium; 12 p.
YEAR : 1977
TEXT : Presents design and construction costs for a sand filter system. Primary treatment of sewage by a septic tank is followed by effluent filtration through a gravel-sand medium. Chlorination follows the filtration step. Data show the system can decrease 5-day BOD and suspended solids by 97 and 88 percent, respectively. (SWF)

ACC# : L000545
AUTHOR: Deese, P.L.; Hudson, J.F.
AFFIL : Urban Systems Research and Engineering, Inc.
TITLE : Planning Wastewater Management Facilities for Small Communities
SOURCE: Urban Systems Research and Engineering, Inc., 36 Bolyston Street, Cambridge, Mass. 02138; 147 p.
YEAR : 1979
TEXT : This manual presents a set of procedures for planning wastewater management for small communities, and is directed at areas with populations of under 10,000. It is designed to aid engineers and the communities they serve in operating and evaluating various options for disposing of the wastewater, which range from septic tanks and on-site disposal fields at one end of the spectrum, to conventional gravity sewers and centralized biological treatment plants at the other. The manual presents information and techniques for recognizing and evaluating wastewater management problems frequently faced by small communities and for planning the range of facilities which will solve those problems, giving due consideration to costs, community characteristics, and growth management. In essence, it is a guide to performing the first stage (Step 1) under the EPA Municipal Construction Grants Program. (AU)

ACC# : L000546
AUTHOR: N/A
AFFIL : Office of Appropriate Technology, California
TITLE : Present Value: Constructing a Sustainable Future
SOURCE: Office of Appropriate Technology, State of California, 1530 10th St., Sacramento, California 95814; p. 28-34
YEAR : 1979
TEXT : A variety of energy-conserving technologies are currently in use in California. Descriptions include: the Farallones Institute's greywater irrigation systems, Stinson Beache's model On-Site Wastewater Management District, the use of worms to convert sludge to fertilizers, and a wastewter treatment system in Hercules that will

employ intensive solar aquaculture. (SWF)

ACC# : L000547
AUTHOR: Cewin, V.H.; Eastgate, B.P.
AFFIL : N/A
TITLE : Package Plant Augmentation of Kidlington Sewage Works
SOURCE: Effluent and Water Treatment Journal, Volume 19(8); 2 p.
YEAR : 1979
TEXT : The use of package treatment plants in conjunction with existing facilities is described. Circular steel tanks equipped with a centrally located mechanical surface aerator are alternated as an aeration tank and final clarifier. Package plant augmentations allow additional housing developments, prevent overloads and decrease pollution. (SWF)

ACC# : L000548
AUTHOR: Dearth, K.H.
AFFIL : Environmental Protection Agency
TITLE : Impact of New Federal Legislation On On-Site Wastewater Systems
SOURCE: Journal of Enviornmental Health, Volume 41(3); p. 158-159
YEAR : 1978
TEXT : The U.S. Environmental Protection Agency (EPA) Construction Grants Program is described. Six provisions of the 1977 amendments to the Federal Clean Water Act relate to on-site wastewater systems: 1) four percent set-aside in rural states for allotments to alternative treatment systems in towns of 3,500 population or less, 2) eligibility of privately-owned individual systems for funding if a public body assumes responsibility for the operation and maintanence of the system, 3) increase from 75 to 85 percent matching funds for alternative or innovative systems, 4) simplification of the application process for projects up to $2 million, 5) availability of federal funds to assist states with the management of the Construction Grants Program, and 6) EPA authorization to provide technical and legal assistance to grantees. (SWF)

ACC# : L000549
AUTHOR: Bernhart, A.P.
AFFIL : Environmental Engineering and Planning, 23 Cheritan Ave., Toronto, Canada
TITLE : Evapotranspiration and Soil Infiltration of Wastewater During Record Low Temperatures in Winter 1976/1977
SOURCE: Environmental Engineering and Planning, 23 Cheritan Ave., Toronto, Canada, 8 p.
YEAR : 1977
TEXT : Evapotranspiration and soil infiltration are useful alternative methods of wastewater disposal. They have been found to be effective at temperatures as low as -22 degrees centigrade, if the following conditions are met: first, that the wastewater contains only low concentrations of BOD (about 50 mg/l) and SS (about 70 mg/l) and that it carries ample dissolved free oxygen (3 mg/l or more); and second,the seepage beds are properly designed for area (150 to 220 square meters per cubic meter of daily flow of wastewater), for depth (45 to 60 cm), for distribution (level contact area, clay terms), for vegetation (full, lush surface cover) and for stormwater diversion (humps, swales, ditches). (AU)

ACC# : L000550
AUTHOR: Laak, R.
AFFIL : Associate Professor of Civil Engineering, University of Connecticut
TITLE : Pollutant Loads from Plumbing Fixtures and Pretreatment to Control Soil Clogging
SOURCE: National Association of Environmental Health - Individual Sewage Disposal System Workshop; 10 p.
YEAR : 1974
TEXT : Three areas of concern in the disposal of domestic wastewater are discussed: soil clogging, pollution loads and pretreatment efficiencies. Presents material dealing with effects of these areas on development of a clogging mat on the soil surface. Attempts to update existing codes of practice for on-site disposal of domestic wastewaters. (SWF)

ACC# : L000551
AUTHOR: Kalbermatten-JM
AFFIL : Energy, Water and Telecommunications Dept., World Bank, Washington, D.C.
TITLE : New Prospects for Urban Excreta Disposal in Developing Countries
SOURCE: Progress in Water Technology, 11(1); p. 225-234
YEAR : 1978
TEXT : Existing conditions of water supply and excreta disposal in developing countries, the historical development leading to present excreta disposal practices, and the costs of using these practices in developing

countries are reviewed. Alternative actions are discussed. (AU)

ACC# : L000552
AUTHOR: Bradley, R.M.; Alvares da Silva, M.C.S.
AFFIL : D. Bradley Balfour & Sons, Brazil, da Silva-Campanhia de Sancamento Basico do Estado de Sao Paulo (SABESP)
TITLE : Stabilization Lagoons Including Experience in Brazil
SOURCE: Effluent and Water Treatment Journal; p. 21-29
YEAR : 1977
TEXT : Some of the different design criteria currently in use for waste stabilization lagoons and a summary of operating data obtained from different lagoon systems treating domestic sewage in Brazil are discussed. Particular reference is made to anaerobic, facultative and aerated lagoons. (AU)

ACC# : L000553
AUTHOR: N/A
AFFIL : Consumer Reports
TITLE : Water: Time to Start Saving?
SOURCE: No. 5, May 1978, p. 294-295
YEAR : 1978
TEXT : The potential for water shortages and the slowly emerging concept of water as a limited resource are discussed. Incentives for domestic water conservation include the associated lowering of the costs of treating and distributing clean water and disposing of wastewater as well as reducing the need for facility expansion. Arizona's dropping water table is discussed. The water conservation efforts that resulted in a 65 percent drop in Marin County, CA, water consumption are briefly described. (SWF)

ACC# : L000554
AUTHOR: Siegrist, R.L.
AFFIL : Small Scale Waste Management Project
TITLE : Management of Residential Grey Water
SOURCE: Small Scale Waste Management Project; University of Wisconsin, Madison, 23 p.
YEAR : 1978
TEXT : Residential greywater flow rates, their physical and chemical constituents, and microbiological characteristics are described. Treatment alternatives are identified and studies conducted at the University of Wisconsin are discussed. Results indicate that greywater is easier to manage than combined wastewater because of reductions in flow volume, pollutant level and potential for pathogenic contamination. (SWF)

ACC# : L000555
AUTHOR: Hasfurther, V.R.; Foster, D.H.
AFFIL : Eisenhower Consortium of Western Environmental Forestry Research
TITLE : Operation and Design of Evapotranspiration Waste Disposal Systems
SOURCE: Eisenhower Consortium Bulletin 6, Rocky Mountain Forest and Range Experiment Station, Fort Collins, Colorado 80521; 21 p.
YEAR : 1978
TEXT : An evapotranspiration (ET) unit for wastewater disposal was constructed and operated for two years. The results indicate that the use of ET systems for treating wastewater from rural and mountain second homes during warm seasons is feasible. Wastewater treatment efficiencies through chemical and biological action are high and in many cases within marginal water use criteria or EPA standards. Examples of ET unit sizimg are given. ET units are cost-competitive with conventional on-site systems, provide zero ground and surface water pollution, and are readily adaptable to most rural and mountainous areas. (AU)

ACC# : L000556
AUTHOR: Asplen, E.W.; Hampp, C.W.; Long, S.L.; Pavon, D.E.
AFFIL : Dorchester County Health Dept., Maryland
TITLE : Evapotranspiration Method of Wastewater Disposal
SOURCE: Dorchester County Health Dept., Maryland; 48 p.
YEAR : 1977
TEXT : Four evapotranspiration (ET) beds, two lined and two unlined above-grade systems, were tested for two years in Dorchester County, Maryland. Results indicate that rainfall and temperature heavily influence ET rate. Water capacity of the (ET) beds can be predicted by means of a multiple regression equation in which the independent variables are ambient temperature and rainfall. Crowning of the ET bed was helpful in shedding rainfalls. Grass cover of three to five inches was found to enhance (ET) rates. Aerobic treatment prior to disposal into the ET beds was thought to be preferable over anaerobic treatment since it appears that a higher internal temperature of the effluent results in higher rates of evaporatranspiration. (SWF)

ACC# : L000557
AUTHOR: Whitmore, M.
AFFIL : Boulder City-County Health Department
TITLE : Individual Sewage Disposal System Surveys
SOURCE: Boulder City-County Health Dept., 3450 Broadway, Boulder, CO 80302; 64 p.
YEAR : 1977-1979
TEXT : Included under this title are 16 surveys conducted by the Boulder City-County Health Department of Colorado. Evapotranspiration, septic systems, raised bed septic systems, and aerobic sewage treatment systems were surveyed. Each survey includes information on reliability of mechanical components, maintenance requirements and efficiency in terms of effective disposal. Twelve community on-site surveys which included personal interviews and site inspection of existing sewage facilities and water supply systems are included. Data from the onsite surveys include tabulations of failing systems, system age and system types. Conclusions are drawn from the field observations and the tabulated data from each survey. Recommendations are given for improving system reliability and reporting. (SWF)

ACC# : L000558
AUTHOR: van Eck, W.A.; Moe, P.G.; Anderson, R.E.; Zaltzman, B.
AFFIL : West Virginia University
TITLE : On-Site Wastewater Disposal - Land and Water Information Series No. 1 (1978 Conference Proceedings)
SOURCE: Cooperative Extension Service, West Virginia University Center for Extension and Continuing Eduction; 110 p.
YEAR : 1978
TEXT : Alternative on-site collection, treatment and disposal systems are discussed with respect to their desireability, feasibility, and environmental and economic aspects. Guidelines and eligibility for the 55 percent special grant established by EPA are explicitly defined under the 201 program. A panel discussion section is included that deals with various on-site alternatives for treatment, disposal and disinfection of wastewater. Appendixes contain West Virginia State Health Department and national standards for individual on-site systems and design considerations, objectives and evaluations of on-site systems, and manufacturer's list for aerobic wastewater treatment plants. (SWF)

ACC# : L000559
AUTHOR: N/A
AFFIL : National Environmental Health Association's On-Site Wastewater Management Committee
TITLE : The 1979 State of the Art Manual of On-Site Wastewater Management
SOURCE: National Environmental Health Association, 1200 Lincoln St., Suite 704, Denver, CO 80203, 108 p.
YEAR : 1979
TEXT : Describes a wide variety of conventional and alternative waste disposal systems. Emphasis placed on systems which dispose of or utilize wastewater on-site. Outlines requirements for systems design, site evaluation and percolation tests. Included useful diagrams and tables. (SWF)

ACC# : L000560
AUTHOR: Environmental Sanitation Information Center
AFFIL : N/A
TITLE : Environmental Sanitation Abstracts - Low Cost Options
SOURCE: Environmental Sanitation Information Center, Asian Institute of Technology, P.O. Box 2754, Bangkok, Thailand; 61 p.
YEAR : 1979
TEXT : This bibliography is designed to make relevent information on sanitation problems available to people in developing countries. Subject coverage includes non-conventional and conventional methods of collection, reuse and disposal of domestic wastewater and human wastes. Periodic updates are forthcoming. (SWF)

ACC# : L000561
AUTHOR: Boyle, W.C.; Otis, R.J.
AFFIL : University of Wisconsin, Madison, Wisconsin
TITLE : On-Site Treatment
SOURCE: Environmental Research Information Center, Office of Research and Development, US EPA, Cincinnati, OH 45268; 77 p.
YEAR : 1979
TEXT : Discusses several wastewater alternatives for small communities. Furnishes information dealing with description, applicability, treatment capacity, operation, maintenance requirements, environmental concerns, costs, comments, source materials and demonstration installations. Includes diagrams. (SWF)

ACC#   : L000562
AUTHOR: Irvine, R.L.; Busch, A.W.
AFFIL : University of Notre Dame, Indiana
TITLE : Sequencing Batch Biological Reactor - An Overview
SOURCE: Journal Water Pollution Control Federation, 51(2); p. 235-243
YEAR   : 1979
TEXT   : Sequencing batch reactor operation and recent findings in their technology are described in this overview. Various control strategies for sequencing single and multi-tank systems are examined. A descriptive summary of sequenced batch reactors is included. (SWF)

ACC#   : L000563
AUTHOR: Clark, L.K.; Eblen, J.E.
AFFIL : C & G Engineering, Salem, Oregon
TITLE : A Demonstration Project on Vacuum and Pressure Sewers at Bend, Oregon
SOURCE: American Public Works Association, Oregon Section, Oct. 14, 1976, 21 p.
YEAR   : 1976
TEXT   : The report presents information on a demonstration project employing pressure and vacuum systems at Bend, Oregon. Bend is underlain with bedrock, making excavation for conventional gravity sewers very costly. Therefore pressure and vacuum sewer systems were studied as alternatives. Eleven service connections for both the vacuum and pressure sewer systems were constructed and monitored to determine performance, maintenance, and cost of each individual connection and for each type of system. Pressure sewer systems used two-inch diameter PVC Type I Class 160 pipe, buried at not less than three feet, for main lines. Submersible centrifugal pumps, with a 25 gallon per minute capacity, were used for each connection to pump septic tank effluent into the main line. Vacuum systems used three to six-inch diameter lines made of PVC Class 200 or Schedule 40, joined by solvent weld joints. Two vacuum pumps drew from a 400 gallon vacuum reserve tank to a 400 gallon collection tank terminus to protect pumps agains entry of collected sewage. More comprehensive cost and performance data are presented in the EPA booklet entitled "Pressure and Vacuum Sewer Demonstration Project - Bend, Oregon" (L000523). (SWF)

ACC#   : L000564
AUTHOR: Kirkup, R.E.; Nelson, L.R.
AFFIL : Street, Sewer and Water Department, Burlingame, California
TITLE : City Fights Grease and Odor Problems in Sewer Systems
SOURCE: Reprint from Public Works Magazine, 2 p.
YEAR   : 1977
TEXT   : Discusses use of special dried bacterial cultures for the removal of grease and malodors from sewage lines and pumping stations. Initial heavy applications of cultures were followed by smaller maintenance amounts. Dosage levels were determined by measuring daily flow through the system. Culture additions were made from two gallons of water for each pound of dry bacterial product. (SWF)

ACC#   : L000565
AUTHOR: Leich, H.H.
AFFIL : Compost Science
TITLE : California Takes the Lead in Probing On-site Systems
SOURCE: Compost Science/Land Utilization, 20(3), 2 p.
YEAR   : 1979
TEXT   : A review of the final report of the Rural Wastewater Disposal Alternatives - Phase I (L000526). Describes the initiative, scope and summarizes the report. (SWF)

ACC#   : L000566
AUTHOR: Porto, D.D.; Scott, R.
AFFIL : Watershed, Inc.
TITLE : SYZYGY
SOURCE: New Roots, 1(3): 48-49
YEAR   : 1978
TEXT   : A united effort between appropriate technologists and government agencies to meet future wastewater treatment and disposal objectives is called for by the authors. Suggestions for applied research are made and areas to be examined for interaction of various technologies are discussed. (SWF)

ACC#   : L000567
AUTHOR: O'Brien, W.J.; McKinney, R.E.; Turvey, M.D.; Martin, D.M.
AFFIL : Civil Engineering Dept., U. of Kansas, Lawrence, Kansas
TITLE : Two Methods for Algae Removal from Oxidation Pond Effluents

SOURCE: Water and Sewage Works, 120(13): 66-73
YEAR : 1973
TEXT : A submerged rock filter and an upflow fly ash filter were evaluated for removal of algae from oxidation pond effluent. Results from the two lab studies indicate that the two systems should be field tested and evaluated. Both systems are expected to require little operator attention. The needed equipment is readily available, and would add little (2 - 11 percent) to the construction cost of an oxidation pond. (SWF)

ACC# : L000568
AUTHOR: N/A
AFFIL : N/A
TITLE : Summary of Projects: Appropriate Energy Technology, Pilot Regional Project
SOURCE: U.S. Dept. of Energy, San Francisco Operations Office, 1333 Broadway, Oakland, CA
YEAR : 1978
TEXT : A regional pilot program promoting idea development, concept testing and demonstration of appropriate energy technology projects on a small scale has provided monetary grants. This summary of projects includes the categories of biomass-recycle, wastewater, aquaculture, and integrated systems. (SWF)

ACC# : L000569
AUTHOR: N/A
AFFIL : Consumer Reports
TITLE : Saving Water in the Home 1. When You Flush the Toilet 2. When Taking a Shower
SOURCE: Consumer Reports, 43(5): 296-302
YEAR : 1978
TEXT : Devices designed to conserve water when flushing the toilet and taking a shower were tested and evaluated according to water consumption, ease of installation, performance and cost. Commercially available dams, weights, dual flush units, air bleeds and replacement tanks were found to function no better than do-it-yourself methods which are also described. Low-flow shower heads, flow restrictors and shut-off controls for showers were rated at low pressure and at 50 and 80 psi. The addresses of distributors and the prices of the products tested were included in the ratings. (SWF)

ACC# : L000570
AUTHOR: Jopling, W.F.
AFFIL : N/A
TITLE : Alternative Greywater Disposal Systems
SOURCE: Rural Wastewater Disposal Alternatives (L000526)
YEAR : 1977
TEXT : Sites, operation and design requirements for greywater systems are briefly outlined. Seepage pit and leachfield trench and line specifications and diagrams are included. A sedimentation tank design utilizing 55 gallon drums is depicted. (SWF)

ACC# : L000571
AUTHOR: N/A
AFFIL : W.Va. State Board of Health
TITLE : Small Sewage and Excreta Disposal Systems Regulation
SOURCE: West Virginia State Board of Health, Charleston, WV, 15 p.
YEAR : 1975
TEXT : West Virginia's regulations concerning the disposal of wastewater from individual homes and small housing developments, as adopted by the W.Va. State Board of Health, are included in this booklet. Thirteen sections outline disposal requirements, permits, inspection, construction and installation criteria and necessary definitions. The regulations became effective Feb. 1, 1975. (SWF)

ACC# : L000572
AUTHOR: Cantrell, R.D.
AFFIL : Prince William Health District, 9301 Lee Avenue, Manassas, VA
TITLE : Re-cycling of Treated Wastewater Can Solve the Sewage Disposal Problem For Rural Service Stations
SOURCE: Journal of Environmental Health, 42(1): 13-18
YEAR : 1979
TEXT : A four-year study of a greywater recycling facility at an interstate service station showed the system to be effective in reducing average daily flow by 25 to 50 percent. By using flow control devices, a once failing septic tank-soil absorption system was made operative. The facility was redesigned to handle peak flows that occur during the holidays. (SWF)

ACC# : L000573
AUTHOR: Jaslow, L.
AFFIL : N/A
TITLE : Reducing Household Water Use
SOURCE: Essays on Food and Energy by Howard Community College and Foundation for Self-Sufficiency, Inc., 35 Maple Ave., Catonsville, MD 21228
YEAR : 1977
TEXT : This article provides a systematic review of household water use and water conservation tips. Includes descriptions of do-it-yourself modifications for toilets, spigots, and showers as well as numerous suggestions for improving water use habits. The impact of household water use and reduction on water, plumbing and wastewater systems is also discussed. (SWF)

ACC# : L000574
AUTHOR: Flanagan, J.D.; Ott, C.R.
AFFIL : Camp Dresser & McKee, Inc., Boston, Mass.
TITLE : Chemical Oxidation of Septage
SOURCE: Journal of Water Pollution Control Federation, 51(7), 10 p.
YEAR : 1979
TEXT : Because of high concentrations of organic matter and solids, low dewaterability, and the objectionable odors associated with septage, conventional treatment/disposal systems have been unsatisfactory for its disposal. This research was directed toward use of chemical oxidants other than chlorine to decrease the organic strength and obnoxious qualities of septage and to improve its dewaterability. Ozone compared favorably with chlorine in decreasing supernatant chemical oxygen demand and improving sludge dewatering without increasing the solids concentration. Ozone affected septage pH less than chlorine, and was more effective in reducing odor. Hydrogen peroxide was less effective than ozone or chlorine. (AU)

ACC# : L000575
AUTHOR: Cueijo, J.
AFFIL : University of Florida, Gainesville, FL
TITLE : Harvesting a Nuisance
SOURCE: Environment, 19(2), 5 p.
YEAR : 1977
TEXT : The same characteristics that render the water hyacinth a major nuisance in southeastern United States contribute to its ability to help solve another problem. One acre of water hyacinths can remove 3,075 pounds of nitrogen per year from wastewater, as well as phosphorus, heavy metals and other chemical contaminants present in sewage sludge. The plants can then be used as an energy source, fertilizer, livestock feed additive and, perhaps, eventually as a protein supplement for humans. (SWF)

ACC# : L000576
AUTHOR: Gas, T.E.
AFFIL : Director of Technical Services, National Water Well Association
TITLE : State of the Art: Domestic Wastewater Treatment and Disposal
SOURCE: Water Well Journal, 3 p.
YEAR : 1977
TEXT : Describes anaerobic treatment in septic tanks and aerobic treatment in aeration tanks. Operation and problems of soil absorption bed following both treatment procedures is explained. Purpose of the paper was to encourage well drillers to get into waste treatment busines

ACC# : L000577
AUTHOR: Winneberger, J. T.
AFFIL : Septic-Tank Systems
TITLE : A System for Treatment and Disposition of Low Volumes of Domestic Wastewaters
SOURCE: Rural Wastewater Disposal Alternatives (L000526) Final Report - Phase I, A Report to the California State Water Resources Control Board, Sept. 1977, Appendix C, p. 71-76.
YEAR : 1977
TEXT : A waste system plan for receiving small flows of household wastewater with only small amounts of suspended solids and no large solids is presented. The design consists of a 30 gallon settling tank that overflows onto a subsurface disposal or irrigation field. Installation and maintenance advice for this low volume system is included.

ACC# : L000578
AUTHOR: Warshall, P.
AFFIL : Co-Evolution Quarterly
TITLE : Greywater Re-use
SOURCE: The Co-Evolution Quarterly, No. 13, Spring, 1977, 2 p.

YEAR : 1977
TEXT : Interest in re-using greywater has grown as a result of the increasing awareness that it is wasteful to use the highest quality water for low quality uses such as flushing the toilet and watering the garden. While acknowledging that the re-use of greywater is in violation of the uniform plumbing code, the author describes methods for diverting, collecting, filtering, pumping and irrigating with greywater. Suggestions for lowering water consumption are also included. (SWF)

ACC# : LC00579
AUTHOR: N/A
AFFIL : Family Health
TITLE : Introducing the Flushless Toilet
SOURCE: Family Health, Vol. II, No. 6, p. 34
YEAR : 1979
TEXT : Provides an overview of the operation of a composting toilet and describes a family's reasons for installing one. (SWF)

ACC# : LC00580
AUTHOR: Jopling, W.F.
AFFIL : N/A
TITLE : Guidelines for Pit Privy Construction
SOURCE: Rural Wastewater Disposal Alternatives (L000526)
TEXT : Guidelines for the design, construction and installation of owner-built pit privies for remote rural single-family dwellings are described. A materials list and detailed plan for a privy are included. The guidelines were drafted in 1976 for the Northern California Environmental Health Directors Ad Hoc Committee on Alternative Methods of Sewage Disposal. (SWF)

ACC# : L000581
AUTHOR: Clark, Z. and Friends
AFFIL : Compost, Star Route 3, Bath, Maine
TITLE : Cheap Tricks for North Country Compost Toilets, Wastewater Recycling and Methane Digesters
SOURCE: Compost, Star Route 3, Bath, Maine, 27 p.
TEXT : Inexpensive ways to improve performance of various types of composting toilets are expressed in this booklet. Experience of a salesman-builder-consultant-owner of indoor sit-down johns, chinese jar toilets, vietnam privies, mounds, and many different compost toilet types are discussed. Tips for constructing, operating, and modifying these systems are included. (SWF)

ACC# : L000582
AUTHOR: N/A
AFFIL : Farallones Institute Rural Center
TITLE : Summary: The Farallones Institute Rural Center Compost Privy Project
SOURCE: Rural Wastewater Disposal Alternatives (L000526), Final Report - Phase I, A Report to the State Water Resources Control Board, State of California, Appendix C, pp. 92-98
TEXT : Studies performed on owner-built composting toilets indicate that they a do not allow heat to build up to temperatures necessary for destroying all parasitic ova. Hay and straw were found to be the best materials to charge composting bins, as they rapidly heat up. Suggestions for a pasteurizing 55-gallon drum privy heated by a solar oven are made. The protocol and procedures used for the study are given in detail. (SWF)

ACC# : L000583
AUTHOR: Welsh, G.; Kaun, E.
AFFIL : Foundation for Self-Sufficiency, Inc.
TITLE : A Renewable Fertilizer
SOURCE: Essays on Food and Energy by Howard Community College & The Foundation For Self-Sufficiency, Inc., 35 Maple Ave., Catonsville, MD 21225
YEAR : 1977
TEXT : Provides a rationale for using dilute human urine as a fertilizer. Describes the results of an experiment that consisted of watering one group of potted corn seedlings with diluted urine (5:1 Water to Urine) and the control group with water. The control group quickly depleted the available nutrients while the urine-fertilized sample flourished. The height and weight of the experimental corn exceeded the control group by over 200 and 700 percent, respectively. Disease transmission and handling of urine are briefly discussed. Includes tables of the average composition of normal urine in grams per day the the quantity and market value of selected urine components produced annually by the U.S. population. (SWF)

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ACC#   : L000584
AUTHOR: Sharpe, W.E.
AFFIL : Penn. State. Univ., Univ. Park, PA  16802
TITLE : Municipal Water Conservation Alternatives
SOURCE: Water Resources Bulletin, 14(5): 1080-1087
YEAR  : 1978
TEXT  : The municipal water conservation options available to meet the goals of
        a national water conservation policy are evaluated.  Water conservation
        devices are shown to offer many significant advantages over education,
        pricing and metering as a method of accomplishing conservation goals.
        Current constraints on the use of water conservation devices are cut
        lined, and their elimination is suggested if the nation's water conser-
        vation goals are to be met. (AU)

ACC#   : L000585
AUTHOR: Laak, R.
AFFIL : Department of Civil Engineering, University of Connecticut, Starrs,
        Conn.
TITLE : Influence of Pretreatment on Soil Clogging
SOURCE: Proceedings of the First National Conference on Individual Onsite
        Wastewater Systems, Ann Arbor Sciences Publishers, Inc., P.O. Box 1425,
        Ann Arbor, MI 48106, 4 p.
YEAR  : 1977
TEXT  : The results of this three year study involving 14 homes indicates
        that the rate of soil clogging is dependent upon the BOD and TSS load
        applied to the seepage bed.  Pretreatment to reduce these quantities
        can permit smaller seepage bed installations where very permeable and
        well drained soils exist.  Pretreatment has little effect upon wet or
        clay soils. (SWF)

ACC#   : L000586
AUTHOR: N/A
AFFIL : Family Health
TITLE : Recycling Water
SOURCE: Family Health, Vol. II, No. 6, p. 36
YEAR  : 1979
TEXT  : Describes a closed-cycle water system being marketed by pure cycle, of
        Boulder, Colorado.  The 1,500 gallon system treats and filters waste-
        water from all sources in the house and turns it into drinking water.
        The wastewater goes through five separate treatment units that provide
        digestion, ultrafiltration, adsorption, demineralization and steriliza-
        tion.  The system is run by a microcomputer which is linked by telephone
        to the company's computer.  A monthly charge covers the cost of main-
        tenance and replacement parts.  Eliminating the need for a water and
        sewer system, this closed-loop system was designed for areas with insuf-
        ficient or low-quality water. (SWF)

ACC#   : L000587
AUTHOR: Smil, V.
AFFIL : University of Manitoba, Winnipeg
TITLE : Energy Solution in China
SOURCE: Environment, 19(7): 27-31
YEAR  : 1977
TEXT  : The design and successful operation of biogas digesters in use in the
        People's Republic of China is described.  Biogas generation provides an
        environmentally sound way to convert human, livestock and crop waste
        into fuel and fertilizer.  This small-scale technology is particularly
        applicable to rural areas with a high density of human population, large
        numbers of domestic animals and a warm climate where there is a shortage
        of fuel.  By 1975 over 400,000 digesters were built or were under con-
        struction using locally available materials. (SWF)

ACC#   : L000588
AUTHOR: Besik, F.
AFFIL : Dept. of Applied Chemistry, Ontario Research Foundation, Sheridan Park,
        Ontario, Canada
TITLE : Renovation of Domestic Wastewater
SOURCE: Water & Sewage Works, 120(4): 78-83
YEAR  : 1973
TEXT  : The results of a 15,000 gal. per day pilot plant system for purification
        of domestic sewage suitable for installation in an apartment building
        are discussed.  In a 30-day test run of the biological-chemical-physical
        treatment plant, water was purified to drinking water quality.  The sys-
        tem consisted of gross solids screening, high-rate biological aeration,
        clarification, ph control, reverse osmosis, downflow carbon adsorption,
        and ozone disinfection. (SWF)

ACC#   : L000589
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AUTHOR: Nelson, J.O.
AFFIL : North Marin County Water District
TITLE : North Marin's Little Compendium of Water Saving Ideas
SOURCE: North Marin County Water District, Novato, CA 94947, 273 p.
YEAR : 1977
TEXT : Describes water conservation alternatives such as consumer education, water metering and pricing, water-saving devices and appliances, lawn and garden irrigation techniques, low water use land-scaping and regulation. Includes brief descriptions of each water-saving device, model numbers, flow rates, and the manufacturer's address and phone number. Two matrices of manufactures, distributers and water-saving devices follow. A case history of water conservation in the new development of Pacheca Valle and the North Marin Water District in California are included. Features sample regulations and plumbing codes for U.S. counties. Over 100 references are cited. Appendix materials include water-saving tips, drought management and changes in tds concentrations resulting from low-flush toilets. (SWF)

ACC# : L000590
AUTHOR: Cooper, R.
AFFIL : Public Health Dept., University of California at Berkeley
TITLE : Public Health Consideration of On-site Waste Disposal Systems
SOURCE: Rural Wastewater Disposal Alternatives (L000526), Final Report - Phase I, A Report to the California State Water Resources Control Board, Appendix A, pp. 83-88
YEAR : 1977
TEXT : Four factors are considered in evaluating the public health aspects of waste disposal: agent, dose, host response, and manner of contact. A probability matrix technique for addressing the public health problem is presented and discussed. (SWF)

ACC# : L000591
AUTHOR: McGauhey, P.H.; Winneberger, J.H.
AFFIL : University of California at Berkeley
TITLE : Causes and Prevention of Failure of Septic-Tank Percolation Systems
SOURCE: Federal Housing Administration, Washington, D.C. 20411, FHA No. 533, 74 p.
YEAR : 1964
TEXT : Field clogging was identified as the greatest cause of failure in septic-tank systems. Clogging is the result of a combination of physical, chemical, and microbiological factors. The report indicated that current construction practices and equipment can and often do, lead to smearing and compacting of the soil being excavated, thus promoting clogging and system failure. Remedies mentioned were equal dosing/resting periods and uniform loading of the drainfield absorptive areas. These aforementioned practices promote aerobic conditions in the drain field, precluding the soil clogging effects exhibited by ferrous sulfide and bacterial build-ups in the soil absorption area. Design of a narrow trench system was included in the report. It minimized the soil clogging conditions found in standard trench and seepage bed designs. Design requirements and construction details for systems discussed are provided, including pictures and schematic details. (SWF)

ACC# : L000592
AUTHOR: N/A
AFFIL : Family Health
TITLE : Is There a Drip in Your Dream House?
SOURCE: Family Health, Vol. II, No. 6, p. 28
YEAR : 1979
TEXT : The average American family can conserve nearly half the water it uses without personal sacrifice. This article describes water conservation measures pertaining to toilets, showers, faucets, personal habits and lawn watering. (SWF)

ACC# : L000593
AUTHOR: Cohn, M.M.
AFFIL : Editorial Director, Wastes Engineering
TITLE : There Are No "Small" Sewage Works
SOURCE: Wastes Engineering, 33(10) 4 p.
YEAR : 1962
TEXT : An editorial stresses the need to recognize the importance of small and individual sewage treatment systems. Includes comments on the major phases of sewage treatment plant processing from screening to final treatment stages. Disputes the "small" sewage works label. (SWF)

ACC# : L000594
AUTHOR: Calhoun, D.O.

AFFIL : Farmers Home Administration
TITLE : The Role of the Farmers Home Administration in Rural Community Development.
SOURCE: Individual Onsite Wastewater Systems, Fifth National Conference, Ann Arbor Science Publishers, Inc., 230 Collingswood, P.O. Box 1425, Ann Arbor, Michigan 48106
YEAR : 1979
TEXT : Provides an overview of the Farmers Home Administration (FMHA) financial assistance program to rural communities for the development of waste disposal systems. Discusses points related to the structure of the FMHA program, source of and eligibility for funds and FMHA regulations. Also describes comments concerning the unique needs of rural communities and factors affecting the design of wastewater systems. (See L000612) (SWF)

ACC# : L000595
AUTHOR: Rhoades, R.F.; Sisneros, R.R.
AFFIL : New Mexico Environmental Improvement Division, Santa Fe, New Mexico
TITLE : State Overview of Onsite Liquid Waste Disposal Alternatives
SOURCE: Individual Onsite Wastewater Systems, Fifth National Conference, Ann Arbor Science Publishers, Inc., 230 Collingswood, P.O. Box 1425, Ann Arbor, Michigan 48106, 9 p.
YEAR : 1979
TEXT : Examines the track record of on-site alternative wastewater treatment and disposal methods as revealed by thirty-nine state regulatory agencies. Finds that systems which were successfully implemented in one state did not always perform adequately in other states. Includes list of research and evaluation projects being conducted by state agencies and universities on a variety of alternative on-site systems. (SWF)

ACC# : L000596
AUTHOR: Winneberger, J.T.
AFFIL : Private Consultant
TITLE : Setback Needed to Protect Water Supplies From Viruses
SOURCE: On-Site Waste Management (Vol. II), p. 1-13
YEAR : 1976
TEXT : Viral contamination of water and use of soil to remove viruses are discussed. Using four soils: clay loam (two types), sandy clay loam and sandy loam, it was found that all viruses were removed within 100 minutes of contact time with the soil. This 100 minute interval relates to about four inches of travel through the soil. With "tagged" viruses and monterey sand columns, total virus removal occurred at a depth of one foot. Clay was found to be the most effective soil type to remove viruses. Followed by silt and sand respectively; gravel and stones were found to be ineffective. The recommended setback for sewage treatment plants in California is 200 feet from any aquifer, based on results at the Santee plant, although the author feels that the amount of setback required may be reduced to a fraction of that distance. (SWF)

ACC# : L000597
AUTHOR: Randolph, J
AFFIL : Chairman, Senate Environment and Public Works Committee
TITLE : Rural America Needs Special Programs for Sanitation Progress
SOURCE: National Conference on Less Costly Wastewater Treatment Systems for Small Communities, 3 p.
YEAR : 1977
TEXt : Keynote address of the national conference on "Less Costly Wastewater Treatment Systems for Small Communities." Discusses the need for a federally funded program to provide environmentally sound and cost-effective alternative wastewater treatment facilities for rural communities. (SWF)

ACC# : L000598
AUTHOR: McClelland-NI (editor)
AFFIL : N/A
TITLE : National Conference on Less Costly Wastewater Treatment Systems for Small Communities
SOURCE: 115 p.
YEAR : 1977
TEXT : The papers within this volume were presented at the U.S. EPA National Conference on "Less Costly Wastewater Treatment Systems for Small Communities," Reston, Va., April 1977. The focus of the papers is on sound and economical alternatives to conventional centralized wastewater collection and treatment for small communities. Discussions on the then current (1977) governmental policy on wastewater facilities are included. Examples of successful management organizations and cost-effective installations that meet environmental requirements are presented. The following articles in these proceedings have been abstracted by the Clearinghouse: Small Communities and Wastewater Treatment Costs: A New

View (L000632); Rural America Needs Special Programs for Sanitation
Progress (L000597); Current Costs of Conventional Approaches (L000631);
Environmental Effects of Sewering Small Communities (L000645); Effects
of dated National Codes on Costs of Sewered Systems (L000646); The ade-
quacy and Uniformity of Regulations for On-site Wastewater Disposal - A
State Viewpoint (L000156); Environmental Impact of On-site Systems
(L000007); O & M Costs of Wastewater Treatment Plants (L000611); Oppor-
tunities for Use of Innovative Concepts (L000641); Pressure Sewers (with
Glide Idleyld Case Study) (L000055); Fountain Run, Kentucky (Case Study)
(L000017); Boyd County Demonstration Project (L000257); A Consultant's
Overview of On-site Needs (L000178); Centralized Management of Small
Plants (L000001); OWPO Policy (L000131); 208 Program (L000220; State
Perspective - Facilities Planning for Small Unsewered Communities in
Illinois (L000242); FMHA Programs for Small Community Sewage Facilities
(L000612). (SWF)

ACC# : L000599
AUTHOR: Bahor, M.P.; Weeter, D.W.
AFFIL : GAI Consultants, Inc., Monroeville, Pennsylvania
TITLE : Evaporation - A Means of Wastewater Disposal
SOURCE: Proceedings of the ASCE Environmental Engineering Division Specialty
Conference, San Francisco, CA, July 9-11, 1979, pp. 189-199
YEAR : 1979
TEXT : Studies involving 12 evapotranspiration beds found no difference in
evapotranspiration rates of aerobic and anaerobic effluent. Metals were
traced through the systems to assess the possible accumulation of toxic
matter in cover plants, but short-term results indicate there is no
build-up. Insufficient data were cited as the reason for the lack of
proper design methodology for ET beds. (SWF)

ACC# : L000600
AUTHOR: Herzig, W.; Vivona, M.A.
AFFIL : Cahn Engineers, Inc., Walling Ford, Conn.
TITLE : The Use of Septage Lagoons in New England
SOURCE: Sludge, 3(2), 5 p.
YEAR : 1980
TEXT : Design guidelines and parameters for septage disposal lagoons used
in New England are presented. Domestic septage is characterized.
Siting criteria are listed. (SWF)

ACC# : L000601
AUTHOR: DeJounge, L.
AFFIL : Enviroscope, Inc., Corona del Mar, CA
TITLE : The Toa-Throne -- A New Compost Toilet
SOURCE: Compost Science, Sept./Oct., 2 p.
YEAR : 1976
TEXT : The Swedish-built Toa-Throne, a small, easy to install, composting
toilet, processes both human and kitchen organic waste. The end
product is humus, which can safely be used as a soil conditioner and
fertilizer. The unit measures 66 inches long by 51 inches high and
39 inches wide. This composting toilet is especially well-suited for
use in rural areas or where leach fields are not practical. (SWF)

ACC# : L000602
AUTHOR: N/A
AFFIL : University of Wisconsin, Madison
TITLE : On-site Wastewater Disposal For Homes in Unsewered Areas
SOURCE: Small Scale Waste Management Project, Univ. of Wis. - Madison, 16 p.
YEAR : 1973
TEXT : A description of a septic tank-soil absorption system (ST-SA). Its
treatment efficiency and associated problem are discussed in this gen-
eral information pamphlet. Wastewater reduction and alternatives to the
ST-SAS, with regard to treatment and disposal of wastewater, are men-
tioned as possible solutions to problems arising from ST-AS use. (SWF)

ACC# : L000603
AUTHOR: Nero, D.H.
AFFIL : Univ. of Wisconsin
TITLE : A Survey of Domestic Wastewater for Sallmonellae
SOURCE: Univ. of Wis. (Bacteriology Dept.), 124 p.
YEAR : 1974
TEXT : A study, conducted from 1972 to 1973, was to detect and enumerate sal
monella SPP. in small-scale wastewater treatment and disposal systems.
Modes of treatment sampled were: batch aeration, continuous flow aera
tion, physical-chemical precipitation, disc aeration, and septic tank
systems. Effluent from these systems revealed that there was inconsis-
tent removal of salmonellae, with approximately four percent of the
household wastewaters being positive. Discharge from five percent of

the pump trucks servicing these systems was found to have been contaminated with salmonellae. A satisfactory technique to detect and enumerate salmonellae SPP. was developed involving centrifugation, anaerobic enrichment on tetrathionate broth, followed by a most probable number (MPN) test. (SWF)

ACC# : L000604
AUTHOR: Otis, R.J.
AFFIL : University of Wisconsin
TITLE : An Engineering Approach to the Design of On-site Wastewater Treatment And Disposal Systems
SOURCE: Univ. of Wis., Dept. of Civil and Environmental Engineering, 336 p.
YEAR : 1973
TEXT : An in-depth study of on-site systems, pertaining to household wastewater systems, is presented in this thesis. Alternative systems for household wastewater treatment and disposal are examined. Constraints, characteristics, components, costs of components and field demonstrations of these systems are fully explained. Water conservation practices and devices are purported to be practical means of reducing both treatment and disposal problems associated with household systems. Engineering and management approaches to individual household systems are discussed. Data and diagrams for these systems are provided for further clarification and understanding. (SWF)

ACC# : L000605
AUTHOR: Doran, M.D.; Boyle, W.C.
AFFIL : Environmental Engineering, University of Wisconsin, Madison, WI
TITLE : Phosphorus Removal by Activated Algae
SOURCE: Water Research, 13(8), 8 p.
YEAR : 1979
TEXT : Phosphorus removal by the activated algae process was studied in laboratory scale under various conditions of hydraulic loading. Phosphorus removal ranged from 70 percent at 4 H hydraulic retention time to 95 percent at 12 H hydraulic retention time. Chemical precipitation was found to be the predominant mechanism for phosphorus removal. An optical device for introducing light to the process was used which, based on theoretical consideration, significantly increases the efficiency of light utilization by algae cultures. (AU)

ACC# : L000606
AUTHOR: Potter, L.
AFFIL : Office of Water Program Operations, U.S. EPA, Washington, D.C. 20460
TITLE : Operations Manual - Package Treatment Plants
SOURCE: Superintendent of Documents, Government Printing Office, Washington, D.C., 94 p.
YEAR : 1977
TEXT : This three-part operations manual includes basic information, troubleshooting tips, case histories, laboratory safety procedures and management details as they apply to package activated sludge treatment plants. Typical questions that might come from operators are answered. This manual is designed to give the package plant operator a better working knowledge of the basics and aid in more effective operation plants. (SWF)

ACC# : L000607
AUTHOR: N/A
AFFIL : N/A
TITLE : First Oxidation Ponds Built in Costa Rica
SOURCE: Wastes Engineering, 33(4), 2 p.
YEAR : 1962
TEXt : Two successful demonstration oxidation ponds, constructed in Costa Rica, are reported. One project was designed to treat domestic waste, the second to treat wastes from a coffee processing plant. The first, a two-pond system treating domestic waste, was built at a total cost of $10,265 (U.S.). The other system, treating wastewaters from the processing of 10,000 lbs/day of coffee was built at a cost of $6,000 (U.S.). (SWF)

ACC# : L000608
AUTHOR: Grant, B.D.
AFFIL : School of Community and Regional Planning, University of British Columbia
TITLE : Planning Implications of Composting Toilets
SOURCE: Master's Thesis for School of Community and Regional Planning, University of British Columbia, 145 p.
YEAR : 1977
TEXT : The suitability of the composting toilet as a sewage system is evaluated

in this thesis. Topics discussed include planning implications related to land use; potential applications of the toilet and its regulatory status; the comparison of these units with package plants, septic tank and sewer systems; and processes with separate greywater and combined treatment schemes. Detailed descriptions of large and small volume composting toilets are included. A comprehensive list of references on the subject is included. (SWF)

ACC# : L000609
AUTHOR: Olivieri, A.W.; Roche, R.J.; Johnston, G.L.
AFFIL : California Regional Water Quality Control Board
TITLE : Guidelines for the Control of Septic Tank Systems
SOURCE: 1979 National Conference on Environmental Engineering, 8 p.
YEAR : 1979
TEXT : Report presents a summary of guidelines for the control of individual wastewater treatment and disposal systems as approved by the California Regional Water Quality Control Board - San Francisco Bay Basin. Recommendations pertaining to design, construction, operation and maintenance of septic tank systems are included. (SWF)

ACC# : L000610
AUTHOR: Longest, H.L.; Cook, M.B.; Ford, B.B.
AFFIL : United States Environmental Protection Agency
TITLE : New Policies and Regulations for Onsite Systems
SOURCE: Individual Onsite Wastewater Systems, Fifth National Conference, Ann Arbor Science Publishers, Inc., 230 Collingswood, P.O. Box 1425, Ann Arbor, Michigan 48106, 7 p.
YEAR : 1979
TEXT : Activities contributing support to on-site systems development programs include: 1) the formation of a white house task force to address rural water and sewer problems: 2) the preparation of two manuals, one by the task force to explain federal rural water and sewer programs, and a technical manual by EPA on the state of the art of on-site systems; 3) a new national water policy statement which emphasizs conservation and resource management; and 4) the passage of the clean water act of 1977, which is particularly sympathetic to the needs of small communi- ties. Explains key provisions of the 1977 act that apply to on-site systems. (SWF)

ACC# : L000611
AUTHOR: Gamble, J.L.
AFFIL : Whitestown, Ind.
TITLE : O & M Costs of Wastewater Treatment Plants
SOURCE: National Conference on Less Costly Wastewater Treatment Systems for Small Communities (April 12-14, 1977), p. 33-41
YEAR : 1977
TEXT : The article describes the problems of financing a sewage system for a small town (Whitestown, Ind). The actual system constructed cost more than the assessed value of the entire town. Local background information shows the financial resources of the town and the way in which the town sought to cope with its financial difficulties. (SWF)

ACC# : L000612
AUTHOR: Walden, G.E.
AFFIL : Community Programs Loan Officer (FMHA), Washington, D.C.
TITLE : FMHA Programs for Small Community Sewage Facilities
SOURCE: National Conference on Less Costly Wastewater Treatment Systems for Small Communities (April 12-14, 1977), p. 93-96
YEAR : 1977
TEXT : The FMHA Program for Small Communities is briefly explained. Funding of the system, basic eligibility requirements of applicants and general FMHA observations are presented in order to clarify FMHA policy regard ing present and future funding (See L000594). (SWF)

ACC# : L000613
AUTHOR: Otis, R.J.
AFFIL : University of Wisconsin, Madison, Wisconsin
TITLE : The Performance of Septic Tanks and Aerobic Treatment Units Under Field Conditions
SOURCE: On-site Waste Management, Vol. IV, Hancor, Inc., p. 1-13
YEAR : 1976
TEXT : Seven septic tanks and four aerobic treatment units were installed at private homes and their performance was evaluated. Results indicate aerobic units produced higher quality effluent than septic tanks but were susceptible to upsets. Aerobic units tended to produce more sludge and required pumping every 10 months. They also had problems with sludge bulking. The utility of sand filters for treating both type effluents was explored with good quality effluent as the result. Total

annual cost of units is included. (SWF)

ACC# : L000614
AUTHOR: N/A
AFFIL : The National Sanitation Foundation
TITLE : The Effect of Home Water Softener Waste Regeneration Brines on Individual Aerobic Wastewater Treatment Plants
SOURCE: NSF Wastewater Laboratory, Ann Arbor, MI (17 pages)
YEAR : 1978
TEXT : This study found little deleterious effect on performance of home aerobic treatment units when waste brine from water softeners was added. Simulated use of a family of five (250 GPD) with added brine was treated daily with laboratory analysis of effluent and aeration chamber contents performed regularly. Tabulated results are included. (SWF)

ACC# : L000615
AUTHOR: Laak, R.
AFFIL : University of Toronto, Dept. of Civil Engineering
TITLE : The Effect of Aerobic and Anaerobic Household Sewage Treatment on Seepage Beds
SOURCE: Library, University of Toronto, Doctoral Thesis, 203 p.
YEAR : 1979
TEXT : The effect of septic tank and oxidation unit effluent on soil treatment beds was evaluated. Parameters included sewage strength, soil depth, soil percolation rate (using different soil types) and temperature. Results showed that septic tank effluent caused field clogging twice as quickly as oxidation unit effluent and that bacterial cells were the primary soil clogger. Soil layers varied from 14 to 56 centimeters and none were dependable in treating effluent. Laboratory soil columns of 14.5 centimeter diameter with a polio virus effluent tracer were used in a majority of the tests with some field correlations. (SWF)

ACC# : L000616
AUTHOR: Effert, D.D.
AFFIL : Iowa State University, Ames, Iowa (Dept. of Bacteriology)
TITLE : Performance of Alternative On-site Wastewater Treatment Systems
SOURCE: Iowa State Univ., Dept. of Bact., Ames, Iowa, 177 p.
YEAR : 1977
TEXT : Four alternative on-site systems were field tested at homes in Iowa over a twenty month period (1975-1977). The Wisconsin mound, sewage osmosis, multi-flow aeration and jet aeration systems were discussed as to their design, installation, performance, reliability, aesthetics and cost. Of the four systems, Wisconsin mounds provided the best effluent quality for the fecal coliform counts and the BOD-5, COD, total nitrogen, and ortho-phosphate concentrations obtained in the study. The other systems did not meet the state and federal standards and/or produced highly variable effluent not consistent with recommended standards. Cost data indicated that the mound system was not the most affordable of the four alternatives studied. (SWF)

ACC# : L000617
AUTHOR: N/A
AFFIL : Eastern Environmental Controls, Inc., Chestertown, Maryland
TITLE : Test Results for the Mini-Plant, Boyd County Wastewater Demonstration Project, Boyd County, Kentucky - 1976-1977.
SOURCE: Eastern Environmental Controls, Inc., Chestertown, Maryland, 42 p.
YEAR : 1977
TEXT : Results compiled from information supplied by the Appalachian Regional Commission, contain site information and effluent quality reports for six mini-plant installations at the Boyd County Demonstration Project. Six brief summaries of complaints and repairs as performed by the operator are included. The results are prefaced by testimony from the hearings on amendments to the federal water pollution control act of 1972. (SWF)

ACC# : L000618
AUTHOR: Smith, C.H.; Hillegas, J.M.; Heinsohn, A.B.
AFFIL : Portstar Industries, Valley Cottage, NY
TITLE : Application of Ultraviolet Radiation to Wastewater Disinfection
SOURCE: Portstar Industries, Valley Cottage, NY (14 pages)
YEAR : 1978
TEXT : Article describes the design of proprietary portstar ultraviolet disinfection equipment from empirical and theoretical viewpoints and presents basic findings from test applications. Advantages, disadvantages and research needs relating to ultraviolet disinfection of sewage effluent are discussed. (SWF)

ACC# : L000619
AUTHOR: Bower, G.C.
AFFIL : Bower Industries, Inc.
TITLE : Bacteria - Their Role in the Sewage Treatment Process
SOURCE: Presented at the Joint Annual Meeting of the Chesapeake Water Pollution Control Association and the Water and Waste Operators Association of Maryland, Delaware and District of Columbia, 5 p.
YEAR : 1972
TEXT : Discusses the role of bacteria in sewage treatment and gives a basic explanation of their biological activity. Article gives examples of specific cultured bacterial use in sewage treatment plants of two cities. In one example, 90.8 percent and 96.6 percent reduction in effluent BOD readings and suspended solids, respectivity, resulted. (SWF).

ACC# : L000620
AUTHOR: N/A
AFFIL : Subcommittee on Waste Disposal of the Committee on Sanitary Engineering and Environment
TITLE : Report on Individual Household Aerobic Sewage Treatment Systems
SOURCE: National Academy of Sciences - National Research Council, Publication, 23 p.
586, 2101 Constitution Ave., N.W., Washington, D.C.
YEAR : 1958
TEXT : This 1958 report was the first major evalution of aerobic treatment units by a research agency. The goal of this report was to provide knowledge of a system's capacity and limitations. Topics include features and processes, individual versus community sewage treatment, testing criteria, conditions of use, unit operation and maintenance. (SWF)

ACC# : L000621
AUTHOR: Bernhardt, A.P.
AFFIL : University of Toronto, Toronto, Canada
TITLE : Treatment and Disposal of Wastewater From Homes By Soil Infiltration and Evapotranspiration
SOURCE: University of Toronto Press, Toronto, Canada, 173 p.
YEAR : 1973
TEXT : Contents of this text include a five-step calculation and design procedure for determining lot sizes for houses and individual buildings with "on-site" water supply and wastewater disposal, protection of water supply wells from wastewater contamination, a general discussion of the design and purpose of on-site wastewater disposal systems and the theory of wastewater treatment. Evapotranspiration and the factors that affect the performance of these systems are also presented. (SWF)

ACC# : L000622
AUTHOR: Hershkovitz, S.Z.; Feinmesser, A.
AFFIL : Economical Use of Water Division, Water Authority, Israel
TITLE : Sewage Reclaimed for Irrigation in Israel Farm Oxidation Ponds
SOURCE: Waste Engineering, 33(8), 4 p.
YEAR : 1962
TEXt : Discusses secondary sewage treatment utilizing aerobic and anaerobic ponds. Studies of 36 oxidation ponds shown marked reduction of coliforms and BOD in sewage previously treated by primary processes. These oxidation ponds serve both as a treatment plant and as a sewage storage reservoir. Prior to treatment in the oxidation ponds, the sewage undergoes pretreatment in either anaerobic earth ponds, concrete sedimentation tanks, imhoff tanks or septic tanks. (SWF)

ACC# : L000623
AUTHOR: Hancock, J.C.
AFFIL : U.S. Department of HUD, Office of Housing, Washington, D.C.
TITLE : Onsite Treatment Manuals
SOURCE: Proceedings of the Fifth National Conference on Individual Onsite Wastewater Systems, Ann Arbor Science Publishers, Inc., P.O. Box 1425, Ann Arbor, MI 48106, 5 p.
YEAR : 1979
TEXT : HUD standards, as they apply to individual on-site wastewater treatment systems, are briefly discussd. The topics include minimum property standards (MPS) for one- and two-family dwellings, "Manual of Acceptable Practice," material releases and bulletins, and local acceptable standards (LAS). (SWF)

ACC# : L000624
AUTHOR: Voss, E.E.
AFFIL : USDA Soil Conservation Service

TITLE : Soil Considerations for On-Site Sewage Disposal
SOURCE: Proceedings of the Illinois Private Sewage Disposal Symposium, Sept. 29-Oct. 1, 1975, Champaign, Illinois; p. 1-16
YEAR : 1975
TEXT : On-site sewage disposal depends upon suitable soils. Problems or failures will be experienced if the soil is not suitable for absorbing and filtering effluent. There are many different kinds of soils with a wide variety of properties and characteristics. Soils can be identified and classified by their properties and characteristics. Soil properties can be studied both in the field and in the laboratory and predictions made about their behavior under different uses. Advisers, designers, installers, and those who regulate septic systems should be familiar with the availability of soils information and how to use it. (AU)

ACC# : L000625
AUTHOR: Hill, R.C.; Parker, D.E.
AFFIL : Bureau of Environmental Health, Division of Health, Wisconsin Department of Health and Social Services, P.O. Box 309, Madison, Wisconsin
TITLE : Soil Testing for Liquid Waste Disposal in Wisconsin
SOURCE: Proceedings of the Illinois Private Sewage Disposal Symposium, Sept. 29-Oct. 1, 1975, Champaign, Illinois; p. 27-33
YEAR : 1975
TEXT : Although comprehensive laws and rules existed in Wisconsin for many years, liquid waste disposal problems relating to ineffective means of law enforcement and lack of knowledge about site suitability still abound. As a result, many systems were installed in totally unsuitable sites. To alleviate the situation, the 1974 certification requirement for small testers was passed and began enforcement on Nov. 1, 1974. Considerable improvement has been noted as about 1800 persons have been certified. For a soil testing program to adequately protect the public health and prevent environmental degradation requires continuous training, strong enforcement practices, and education of the public, the installer, the inspector and the elected government officials. (SWF)

ACC# : L000626
AUTHOR: Mellen, W.L.
AFFIL : Lake County Health Department, Waukegan, Illinois
TITLE : Septic Systems: Effects of Surface and Subsurface Water
SOURCE: 1) Journal of Soil and Water Conservation, 28(5); 2) Proceedings of the Illinois Private Sewage Disposal Symposium, Sept. 29-October 1, 1975 Champaign, Illinois; p. 34-36
YEAR : 1973
TEXT : Runoff from gutters and downspouts can flood a soil absorption system if not controlled. In this article the author offers suggestions to alter basic designs of soil absorption systems by placing underdrains beneath the system. Underdrains carry away excess rainwater that could cause system failure and could also carry away groundwater from high water tables below. (SWF)

ACC# : L000627
AUTHOR: Krebs, J.R.
AFFIL : Multi-Flo, Inc., Dayton, Ohio
TITLE : Home Waste Treatment Plant Effluent Disposal Systems
SOURCE: Proceedings of the Illinois Private Sewage Disposal Symposium, Sept. 28-Oct. 1, 1975, Champaign, Illinois; p. 37-46
YEAR : 1975
TEXT : This paper deals with discharge of aerobically treated effluent. The different elements that control the discharge of the effluent: level of treatment, climate conditions, soil characteritics, bedrock formation, and water table proximity are overviewed. A selection chart utilizing these elements for disposal of small aerobic treatment plant effluent is included. (SWF)

ACC# : L000628
AUTHOR: Hines, M.
AFFIL : Illinois Department of Public Health, Champaign, Illinois
TITLE : The Recirculating Sand Filter: A New Answer for an Old Problem
SOURCE: Proceedings of the Illinois Private Sewage Disposal Symposium, Sept. 28-Oct. 1, 1975, Champaign, Illinois; p. 68-78
YEAR : 1975
TEXT : Design and installation of the recirculating sand filter is informatively discussed in this paper. Topics include siting, sizing, operation, equipment specification and design modification for site specifics. Routine maintenance methods for the recirculation filter and its components are suggested. Summaries of results of effluent samples from their existing recirculating sand filter systems conclude this paper. (SWF)

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ACC#  : L000629
AUTHOR: Coolbroth, F.P.
AFFIL : Coolbroth-Sitton Septic Tanks, Inc., Minneapolis, Minn.
TITLE : Sewage Osmosis Sewage Treatment
SOURCE: Proceedings of the Illinois Private Sewage Disposal Symposium, Sept. 28-
        Oct. 1, 1975, Champaign, Illinois; p. 79-81
YEAR  : 1975
TEXT  : Experiments to produce data for sizing sewage osmosis treatment systems
        were performed.  Results indicate even very tight soils would accept the
        volume of water applied.  Suggestions for further research are made.
        (SWF)


ACC#  : L000630
AUTHOR: Masteller, E.H.
AFFIL : Sippel & Masteller Associates, Inc., Marlton, N.J.
TITLE : Small Town Finds Way to Pay for Treatment
SOURCE: Pollution Engineering, Volume 11(9); 4 p.
YEAR  : 1979
TEXT  : Describes a small community's plan of action in planning and financing
        a new sewage treatment facility.  An innovative combination of treatment
        and disposal systems, a unique site, the perseverance of authority
        members and professionals, and an aggressive search for grants-in-aid
        were the essential components.  (SWF)


ACC#  : L000631
AUTHOR: Dearth, K.H.
AFFIL : Office of Water Program Operations, US Environmental Protection Agency
TITLE : Current Costs of Conventional Approaches
SOURCE: National Conference on Less Costly Wastewater Treatment Systems for
        Small Communities; 3 p.
YEAR  : 1977
TEXT  : Presents current costs of conventional sewage treatment facilities in
        small communities.  Case examples show annual user charges can range
        from $200-400 per family in some communities.  (SWF)


ACC#  : L000632
AUTHOR: Costle, D.M.
AFFIL : Administrator, U.S. Environmental Protection Agency
TITLE : Small Communities and Wastewater Treatment Costs:  A New View
SOURCE: National Conference on Less Costly Wastewater Treatment Systems for
        Small Communities; 2 p.
YEAR  : 1977
TEXT  : Welcoming speech to open the National Conference on "Less Costly Waste-
        water Treatment Systems for Small Communities".  Discusses focus of con-
        ference not only on economical wastewater treatment alternatives but
        also on the development of a governmental policy dealing with funding
        of alternative wastewater treatment projects.  (SWF)


ACC#  : L000633
AUTHOR: Chiang, C.H.
AFFIL : Malcolm-Purnie, Inc., White Plains, N.Y.
TITLE : Regional Planning for Land Application of Wastewater
SOURCE: Journal of Water Pollution Control Federation, 49(12); p. 2366-2370
YEAR  : 1977
TEXT  : Land application of secondary treatment plant effluent and the regional
        planning aspects are discussed.  The identification of potential loca-
        tions and coordination of treatment plant with site are considered by
        use of a screening model that can be evaluated by manual or computer
        techniques.  The algorithm generates several low-cost solutions at very
        low engineering and computer costs.  (SWF)


ACC#  : L000634
AUTHOR: Buchholz, G.M.; Ellis, R.H.
AFFIL : James M. Montgomery, Consulting Engineers, Inc.
TITLE : Systematic Analysis of Rural Wastewater Systems
SOURCE: 1979 National Conference on Environmental Engineering; 5 p.
YEAR  : 1979
TEXT  : Presents planning concepts which can be utilized during the planning
        stages of on-site wastewater facilities.  Included operation and main-
        tenance requirements for on-site treatment units such as aerobic units,
        sand filters and composting toilets.  (SWF)


ACC#  : L000635
AUTHOR: Gloyna, E.F.
AFFIL : College of Engineering, University of Texas, Austin, Texas
TITLE : Waste Stabilization Ponds
SOURCE: World Health Organization, Geneva, 175 p.
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YEAR : 1971
TEXT : Process design procedures of waste stablization ponds, typical pond layout, facility design including pretreatment, flow measurement, piping and earthwork are covered in detail. General considerations and an overview of the worldwide use of stabilization ponds introduce the topic. Proper pond operation, management, personnel, required tools and materials, operation and maintenance checks and tips for start-up are outlined in the concluding chapter. (SWF)

ACC# : L000636
AUTHOR: Middlebrooks, E.J.; Reynolds, J.H.; Middlebrooks, C.H.
AFFIL : Middlebrooks and Associates, Inc., Logan, Utah
TITLE : Performance and Upgrading of Wastewater Stabilization Ponds
SOURCE: Small Wastewater Treatment Facilities Design Seminar Handout (US EPA), Environmental Research Information Center, Cinn., Ohio, (Section I), 1976, 73 p.
YEAR : 1979
TEXT : Aerobic, facultative, and anaerobic lagoons are discussed. Their shortcomings mainly regarding the high algae and suspended solids concentrations in the effluents are also discussed in terms of suggested alternatives for upgrading the different types of lagoons. Design parameters and diagrams for each alternative system are included. Loading rates, biological oxygen demand (BOD5), effluent suspended solids concentrations, fecal coliform counts, system performance data card costs are listed for each alternative presented. Empirical design equations for lagoons were found to be at variance with field data collected. The climatic and other environmental conditions found at the various sites studied are thought to be sources of this variance. Design of lagoons was found to be a combination of experience and rational techniques rather than an implementation of theoretical design criteria. (SWF)

ACC# : L000637
AUTHOR: Benjes, Jr., H.H.
AFFIL : Culp/Wesner/Culp, Box 40, El Dorado Hills, CA 95630
TITLE : Small Community Wastewater Treatment Facilities - Biological Treatment Systems
SOURCE: Small Wastewater Treatment Facilities Design Seminar Handout, US EPA, Environmental Research Information Center, Cinn., Ohio, (Jan. 1975) (Section II), 152 p.
YEAR : 1978
TEXT : Discusses general design, equipment, and personnel considerations regarding small wastewater treatment plants. Six biological treatment alternatives: conventional activated sludge, extended aeration, oxidation ditch, rock media trickling filter, plastic or redwood media trickling filters, and rotating biological media are described. Parameters such as sludge production, oxygen requirements and plant performance are evaluated. Project, unit, and operation and maintenance costs, based on design flow, are included in a cost comparison summary for the biological treatment alternatives. Plant schematics for each alternative are also discussed. (SWF)

ACC# : L000638
AUTHOR: Bowker, R.P.G.
AFFIL : Municipal Environmental Research Laboratory, US EPA
TITLE : Treatment and Disposal of Septic Tank Sludges: A Status Report
SOURCE: Small Wastewater Treatment Facilities Design Seminar Handout, US EPA, Environmental Research Information Center, Cinn., Ohio, (May 1977), (Section III), 52 p.
YEAR : 1977
TEXT : Discusses several alternatives for septage handling and disposal. The alternatives are land application, separate septage treatment facilities, and discharge to sewage treatment plants. Problems often occur with septage discharge to small sewage treatment facilities indicating that in these cases special septage facilities may be required. Septage characteristics are tabulated for several chemical and biological parameters. Sample calculations for sludge production from the various septage treatment processes are given. (SWF)

ACC# : L000639
AUTHOR: Tucker, D.L.; Schroeder, E.D.; Pelz, D.B.; Stenquist, R.J.
AFFIL : Brown & Caldwell, Walnut Creek, California
TITLE : Overland Flow of Oxidation Pond Effluent at Davis, California
SOURCE: Small Wastewater Treatment Facilities Design Seminar Handout, US EPA, Environmental Research Information Center, Cinn., Ohio, (Jan. 1978, Section III); 26 p.
YEAR : 1977
TEXT : Several alternatives to existing oxidation pond systems were studied at Davis, California. The existing facility had become overloaded and high suspended solid concentrations were present in the effluent. Three

alternatives were evaluated: conventional secondary treatment, additional polishing steps of the oxidation pond effluent, and land disposal. The loading rates, sizing considerations, costs and modification requirements were chosen as parameters for comparison. Overland flow method of effluent treatment was chosen on the basis of low cost, treatment feasibility and flexibility, and favorable environmental impact. A loading rate of 32,000 gallons per acre per day for 12 hours on annual rye grass was found to be suitable for effluent disposal. (SWF)

ACC# : L000640
AUTHOR: N/A
AFFIL : US EPA, Environmental Research Information Center, Cinn., Ohio
TITLE : Small Wastewater Treatment Facilities Design Seminar Handout
SOURCE: Small Wastewater Treatment Facilities Design Seminar Handout, Sections I-IV, 310 p.
YEAR : 1978
TEXT : This design seminar handout is a compilation of several articles dealing with small wastewater treatment facilities. The four articles included are: "Performance and Upgrading of Wastewater Stabilization Ponds," "Small Communities Wastewater Treatment Facilities - Biological Treatment Systems," "Treatment and Disposal of Septic Tank Sludges," and "Overland Flows of Oxidation Pond Effluents at Davis, California." These articles have been individually abstracted (L000636, L000637, L000638, L000639). (SWF)

ACC# : L000641
AUTHOR: Williams, T.C.
AFFIL : Williams & Works, Inc., Grand Rapids, Michigan
TITLE : Opportunities for Use of Innovative Concepts
SOURCE: National Conference on Less Costly Wastewater Treatment Systems for Small Communities, April 12-14, 1977, Reston, VA; p. 42-44
YEAR : 1977
TEXT : Innovative concepts can offer an answer to waste treatment for many communities and are particularly useful for smaller ones. There are special problems associated with these concepts as pointed out by the author. (SWF)

ACC# : L000642
AUTHOR: Winblad, U.; Kilama, W.; Torstensson, K.
AFFIL : Royal Institute of Technology, Stockholm, Sweden
TITLE : Sanitation Without Water
SOURCE: Swedish International Development Authority, Stockholm, Sweden; 128 p.
YEAR : 1978
TEXT : Practical information concerning the design, construction and maintance of composting and pit latrines are provided. Emphasis is placed on systems appropriate for individual homes in East Africa. The relationship between sanitation and disease and the composting process are explained. Ten non-water-carriage sanitation systems from different parts of the world are described in order to convey an idea of the variety of systems in use. Variety of design options for each latrine component, suggestions concerning latrine placement and operation, and a detailed account of latrine construction requirements are given. The importance of, and techniques for, fly control are covered in an appendix. (SWF)

ACC# : L000643
AUTHOR: Rathbun, G.J.
AFFIL : University of Wisconsin, Madison
TITLE : Soil Morphological and Moisture Regime Studies of Three Wisconsin Toposequences
SOURCE: Master's Thesis (Soil Science), University of Wisconsin, Madison; 82 p.
YEAR : 1979
TEXT : Soils on three toposequences in Wisconsin were described to compare morphological characteristics used to eliminate zones of seasonal saturation. Different types of soil mottles were dissected from the somewhat poorly drained soils of toposequences. Oxalate was used to extract iron and manganese from mottles, matrix soil and whole soil samples. Ferrans, quasiferrans and high chroma mottles are relatively high in iron compared to neoalbans and the low chroma matrix soil adjacent to high chroma areas. Manganese nodules and high chroma mottles are enriched in manganese and iron relative to matrix and whole soil concentrations. (SWF)

ACC# : L000644
AUTHOR: Mallman, W.L.
AFFIL : Dept. of Microbiology and Public Health, Michigan State University
TITLE : The Role of Tile Drainage in the Design of Septic Tank Drain Fields
SOURCE: On-Site Wastewater Management, Volume I, Hancor, Inc.; p. 1-4
TEXT : This article briefly describes a septic tank-soil absorption system and

the use of tile drainage in this type of effluent disposal system. (SWF)

ACC# : L000645
AUTHOR: Klein, M.W.
AFFIL : Council on Environmental Quality, Washington, D.C.
TITLE : Environmental Effects of Sewering Small Communities
SOURCE: National Conference on Less Costly Wastewater Treatment Systems for Small Communities, April 12-14, 1977, Reston, VA; p. 9-13
YEAR : 1977
TEXT : Environmental conflicts that arise from sewering small communities are discussed in this article. Emphasis is placed on the examination of direct and indirect effects a sewage facility may have upon the area served. (SWF)

ACC# : L000646
AUTHOR: Alford, M.R.
AFFIL : Urban Systems Research & Engineering, Inc., Cambridge, Mass.
TITLE : Effects of Dated National Codes on Costs of Sewered Systems
SOURCE: National Conference on Less Costly Wastewater Treatment Systems for Small Communities (April 12-14, 1977), p. 14-19
YEAR : 1977
TEXT : The author states that one approach to reducing sewer costs is to rethink or re-examine design assumptions and engineering rules-of-thumb. Factors contributing to oversizing of sewered systems are minimum pipe size, per capita flow estimations, infiltration allowances, population projections and design-life periods. Reducing the traditionally accepted design standards to realistic flows and volumes leads to reduced systems costs. (SWF)

ACC# : L000647
AUTHOR: Berry, A.E.
AFFIL : General Manager, Ontario Water Resources Commission
TITLE : In Ontario - Small Plants Play a Big Role in Pollution Control
SOURCE: Wastes Engineering, 33(10), 5 p.
YEAR : 1962
TEXT : Discusses the importance of small sewage works in water pollution control. Developments involving planning, operation and maintenance in sewage treatment facilities have made it possible for small plants to be as efficient as larger systems. (SWF)

ACC# : L000648
AUTHOR: Carlile, B.L.; Stewart, L.W.; Sobsey, M.D.
AFFIL : Dept. of Soil Science, North Carolina State University, Raleigh, NC
TITLE : Status of Alternative Systems for Septic Wastes Disposal in North Carolina
SOURCE: Second Annual Illinois Private Sewage Disposal Symposium, 20 p.
YEAR : 1977
TEXT : Site conditions such as high water tables and slow permeable subsoils are considered unsuitable for conventional septic tank systems because of the inability of these soils to effectively treat the effluent. This article proposes alternative sysems for on-site waste disposal when conventional systems are not practical due to these unsuitable site conditions. (SWF)

ACC# : L000649
AUTHOR: Young, A.N., Jr.
AFFIL : President, Cromaglass Corporation
TITLE : Better Small Sewage Treatment and Disposal Systems
SOURCE: Second Annual Illinois Private Sewage Disposal Symposium, Champaign, Illinois, 16 p.
YEAR : 1977
TEXT : Describes a 1975 demonstration project, near Ashland, Kentucky, supported by the Appalachian Regional Commission. Project evaluates alternatives to central collection and treatment processes, such as aerobic installations and evapo-transpiration systems. (SWF)

ACC# : L000650
AUTHOR: Leon, S.; Fricke, T.; Kroschel, M.; Mathews, S.
AFFIL : Farallones Institute
TITLE : Grey Water Use in the Home Garden
SOURCE: Farallones Institute, Berkeley, CA, 13 p.
YEAR : 1978
TEXT : Discusses the use of household wastewater for garden irrigation. Gives step-by-step instructions for placing a greywater recycling system in home. (SWF)

ACC# : L000651
AUTHOR: Warshall, P.
AFFIL : Land Use/Water Editor of The Co-Evolution Quarterly
TITLE : Septic Tank Practices
SOURCE: Anchor Press/Doubleday, Garden City, N.Y., 93 p.
YEAR : 1979
TEXT : The treatise is written from a semi-technical standpoint for those interested in on-site waste disposal systems and water conservation. Various on-site systems are discussed as to their reliability, maintenance, lifespan, cost, etc. Emphasis is placed on promoting water conservation in the home. Ways and devices to reduce water use are fully explored. Much discussion deals with septic tank - soil absorption systems (ST-SAS) considerations, i.e., sizing, location, design, planning, construction, maintenance and care. Ample diagrams and illustrations highlight the author's points. A flowchart for troubleshooting ST-SAS problems is included along with a list of manufacturers that deal with on-site systems and home water conservation. (SWF)

ACC# : L000652
AUTHOR: Stone, R.; Rowlands, J.
AFFIL : Ralph Stone and Company, Inc. Engineers
TITLE : Alternative Approaches to Conventional Municipal Wastewater Systems for Small Communities
SOURCE: 1979 National Conference on Environmental Engineering, 7 p.
YEAR : 1979
TEXT : Evaluates off-site and on-site innovative and alternative wastewater treatment systems (as defined by the U.S. EPA) for small communities in terms of cost-effectiveness, energy requirements, general environmental impacts, social impacts, and flora and fauna impacts. Discusses technical, institutional and policy incentives and barriers to the use of these systems. (SWF)

ACC# : L000653
AUTHOR: Brown, D.L.; Symuleski, R.A.; Schaefgen, J.R.
AFFIL : Bureau of Standards, Washington, D.C.
TITLE : Wastewater Recycling and Water Conservation
SOURCE: Individual Onsite Wastewater Systems - Proceedings of the Second National Conference, Ann Arbor Science Publishers, Inc., P.O. Box 1425 Ann Arbor, MI 48106 (6 pages)
YEAR : 1977
TEXT : The Use of MIUS (Modular Integrated Utility System) to localize wastewater reuse and to satisfy local irrigation, industrial, and fire fighting needs is discussed. This package system could also reuse water for in-plant processes such as boiler and cooling water needs. Plans by HUD to incorporate MIUS in a full-scale demonstration plant are also discussed. (SWF)

ACC# : L000654
AUTHOR: Ridge, R.; Thoennes, C.M.
AFFIL : Ocean Sciences and Advanced Product Engineering, General Electric Co., RESD, Phil., PA
TITLE : A Look Into the Future
SOURCE: Individual Onsite Wastewater Systems - Proceedings of the Second National Conference, Ann Arbor Science Publishers Inc., P.O. Box 1425, Ann Arbor, MI 48106 (5 pages)
YEAR : 1977
TEXT : Wastewater disposal is discussed in regard to current trends, capital shortage, technological processes involving automation and alternative processes, and suburban and exurban housing. It is predicted that a renewed interest in decentralized wastewater disposal alternatives will develop in the future. (SWF)

ACC# : L000655
AUTHOR: Miller, F.P.; Wolf, D.C.
AFFIL : University of Maryland
TITLE : Renovation of Sewage Effluents by the Soil
SOURCE: Individual Onsite Wastewater Systems - Proceedings of the Second National Conference, Ann Arbor Science Publishers Inc., P.O. Box 1425 Ann Arbor, MI 48106 (29 pages)
YEAR : 1977
TEXT : An extensive discussion of soil properties and their relationship to the treatment and disposal of septic tank effluent. Topics include hydraulic conductivity, filtration, sorption, oxidation and the fate of effluent components. (SWF)

ACC# : L000656
AUTHOR: Pate, P.
AFFIL : Bureau of Environmental Health, Jefferson County Dept. of Health,

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         Birmingham, Alabama
 TITLE : Adequacy and Uniformity of Regulations for Onsite Wastewater Dispcsal,
         "Local Concern"
 SOURCE: Individual Onsite Wastewater Systems - Proceedings of the Second
         National Conference, Ann Arbor Science Publishers Inc., P.O. Box 1425,
         Ann Arbor, MI  48106  (5 pages)
 YEAR  : 1977
 TEXT  : The use of absolute values and uniform regulations as determined
         by state and federal legislators poses problems for local sanitarians an
         health officials who must deal with on-site systems and local land
         developers.  The author calls for more input from local authorities for
         the formulation of regulations and greater freedom to fit regulations to
         local conditions.  (SWF)

 ACC#  : L000657
 AUTHOR: Martin, R.M.
 AFFIL : Div. of General Environmental Health Services, Ohio State Dept. of
         Health, Columbus, Ohio
 TITLE : Subsurface Disposal Methods
 SOURCE: Individual Onsite Wastewater Systems - Proceedings of the Second
         National Conference, Ann Arbor Science Publishers Inc., P.O. Box 1425,
         Ann Arbor, MI  48106  (8 pages)
 YEAR  : 1977
 TEXT  : Advantages and disadvantages of subsurface disposal methods of treated
         wastewater are listed.  The state of Ohio leaching field absorption area
         requirements for disposal of effluents from both aerobic treatment and
         septic tanks are presented.  (SWF)

 ACC#  : L000658
 AUTHOR: Salvato, Jr., J.A.
 AFFIL : Division of Sanitary Engineering, New York State Dept. of Health,
         Albany, NY
 TITLE : Problems and Solutions of Onlot Sewage Disposal
 SOURCE: Individual Onsite Wastewater Systems - Proceedings of the Second
         National Conference, Ann Arbor Science Publishers Inc., P.O. Box 1425,
         Ann Arbor, MI 48106  (13 pages)
 YEAR  : 1977
 TEXT  : Design, construction, operation and maintenance limitations of septic
         tank - soil/absorption systems, cesspools, mounds, ETA, and ET systems
         are reviewed.  The advantages of on-site vs. conventional systems are
         briefly reviewed. (SWF)

 ACC#  : L000659
 AUTHOR: Hammel, R.
 AFFIL : Miller, Canfield, Paddock, and Stone, Detroit, Michigan
 TITLE : Funding Local Share Costs of Federal Clean Water Projects
 SOURCE: Individual Onsite Wastewater Systems - Proceedings of the Fifth National
         Conference, Ann Arbor Science Publishers, Inc., Ann Arbor, MI  48106
         (4 pages)
 YEAR  : 1979
 TEXT  : Discusses problems that local governments will, or may, face when
         attempting to raise their share of the funds to establish, build,
         operate and maintain a federally aided clean water project.  Emphasis is
         placed on Michigan's legal and regulatory problems.  Financing for
         private residential use and industrial development are covered. (SWF)

 ACC#  : L000660
 AUTHOR: Williams, T. C.
 AFFIL : Williams and Works, Inc., Grand Rapids, Michigan  49506
 TITLE : On the Other Hand
 SOURCE: Individual Onsite Wastewater Systems - Proceedings of the  Fifth
         National Conference, Ann Arbor Science Publishers, Inc., P.O. Box 1425,
         Ann Arbor, Michigan  48106  (4 pages)
 YEAR  : 1979
 TEXT  : The goals of federal and state funding are analyzed, and although
         intentions are good, the required adherence to three levels of
         governmental regulations may require reexamination.  Case histories
         recounting the frustrations in developing plans and gaining both federal
         and state approval are presented. (SWF)

 ACC#  : L000661
 AUTHOR: Lewis, A. L.; Mountain, C. W.; Wellings, F. M.
 AFFIL : Epidemiology Research Center, Tampa Florida
 TITLE : Virus in Groundwater
 SOURCE: Individual Onsite Wastewater Systems - Proceedings of the Second
         National Conference, Ann Arbor Science Publishers, Inc., P.O. Box 1425,
         Ann Arbor, MI  48106  (6 pages)
 YEAR  : 1977
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TEXT : Sampling and analysis fallacies of a 1973 Florida Geological Survey study involving virus in septic tank effluents were discussed. The 1973 study concluded that virus contamination from septic tanks was a low potential problem. In contrast to this 1973 study, another study which yielded positive enterovirus in raw water sources is presented. This second study indicates that, under natural conditions, at least in dry weather with heavy pumping of groundwater, septic tank effluents can cau viral contamination. (SWF)

ACC# : L000662
AUTHOR: Kladiuko, E. J.; Nelson, D. W.
AFFIL : Purdue University, West Lafayette, Indiana
TITLE : Changes in Soil Properties From Application of Anaerobic Sludge
SOURCE: Journal Water Pollution Control, 51(2) (8 pages)
YEAR : 1979
TEXT : A one-year field study was conducted at Purdue University to determine the effects of sludge application on selected soils. Variables included three soil types, three sludge incorporation practices and three sludge applications. Application of sludge at 56 metric tons/ha improved the physical condition of the three soils and increased the infiltration rate by 160 to 500 percent in two of the soils. Increases were observed in organic carbon content and cation exchange capacity with increasing application rates. Disking-in appeared to be the most effective method of sludge incorporation. (SWF)

ACC# : L000663
AUTHOR: Otis, R.J.; Nutzler, N.J.; Boyle, W.C.
AFFIL : N/A
TITLE : On-Site Household Wastewater Treatment Alternatives - Laboratory and Field Studies
SOURCE: Water Pollution Control in Low Density Areas - Proceedings of a Rural Environmental Engineering Conference (15 pages)
YEAR : 1975
TEXT : A project at the University of Wisconsin evaluated several treatment processes and designs on the basis of four criteria: effluent quality, variability in effluent quality, maintenance requirements, and total annual costs. Field and laboratory studies of full-scale household treatment units examined included single and multiple-compartmented septic tanks, continuous flow and batch extended aeration units, rotating biological disk units, a chemical precipitation and coagulation unit, intermittent sand filters, and dry-feed chlorinators. The aerobic and septic tanks are discussed. Aerobic units provided better BOD-5 removal compared with septic tanks in both the field and laboratory settings, while total suspended solids removal was not significantly different for the two. Batch aeration units were superior to continuous flow units in removing suspended solids due to the quiescent conditions in the clarifier. Total suspended solids removal was greatest for rotating biological disk units. Aerobic units were more costly to operate and maintain than septic tanks and generally more easily upset. (SWF)

ACC# : L000664
AUTHOR: Deese, P.L.; Hudson, J.F.
AFFIL : Urban Systems Research and Engineering, Ind., Cambridge, Mass.
TITLE : Generating and Analyzing Alternatives
SOURCE: Individual Onsite Wastewater Systems - Proceedings of the Fifth National Conference. Ann Arbor Science Publishers, Inc. P.O. Box 1425, Ann Arbor MI 48106 (6 pages)
YEAR : 1979
TEXT : Discussion of an EPA contracted project, "Engineering and Socio-Economic Impact Evaluation of Wastewater Management Alternatives for Urbanizing and Rural Residential Areas," is included in the article. The tasks of the contract include identification and classification of technologies and their impacts, development and testing of a methodology for facility planning, and preparation of a field use manual describing the method. Use of the manual should lead to environmentally sound and cost-effective options for wastewater management. A hypothetical community is used to illustrate use of the proposed method. An outline of the process steps is included. (SWF)

ACC# : L000665
AUTHOR: London, T.L.
AFFIL : Agricultural Engineering Department, Michigan State University
TITLE : Deflection of Corrugated Drainfield Tubing Under Simulated Field Conditions
SOURCE: N/A (3 pages)
TEXT : Field tests were performed to evaluate the deflection of various strengt four-inch corrugated polyethylene tubing under conditions designed to simulate typical 350 drainfield placement. Corrugated plastic tubing

with stiffness values between 25 and 55 lb/in/in were placed 12 inches beneath two test soils, a clay loam and a sandy loam. The effect of stone bedding around the tubing was also tested. Loading was simulated by passing trucks of various weights across the test sites.

Results showed that deflections in the sandy soil were generally slightly less than those in the clay soil. Stone bedding prevented excessive tubing deflection. Truck loads to 13,600 pounds never produced tubing deflections greater than 0.1 inches where stone bedding was used. Deflections were found to be higher in wet and/or loose soils (up to 1.5). Plastic tubing with a stiffness value of 24 lb/in/in deflected consistently more than tubing in the range of 35 to 45 lb/in/in. (SWF)

ACC# : L000666
AUTHOR: N/A
AFFIL : N/A
TITLE : Wastewater Treatment Plant Design Guidelines for Operability, Flexibility and Maintainability
SOURCE: US EPA Region 10, 1200 Sixth Avenue, Seattle, WA (34 pages)
YEAR : 1978
TEXT : Design guidelines used by EPA Region 10 personnel for the evaluation of proposed treatment plant designs are listed. Also included is a breakdown of the required material to be submitted to the treatment plant along with plans and specifications. Design criteria for various process units are given, including specifications for package plants and lagoon-oxidation ponds. (SWF)

ACC# : L000667
AUTHOR: Klein, S.A.
AFFIL : Sanitary Engineering Research Laboratory, University of California, Berk
TITLE : The Fate of NTA in Septic-Tank and Oxidation-Pond Systems
SOURCE: Sanitary Engineering Research Laboratory, University of California, Berkeley (107 pages)
YEAR : 1971
TEXT : The biodegradability of NTA was measured in a nine-month study utilizing pilot scale septic tank - leaching field and oxidation pond systems. This study was designed to determine the pollution potential of NTA-containing household effluent to groundwaters. NTA is a possible substitute for the phosphate compounds used in detergents. It has been shown to cause fetal abnormalities in rats and to solubilize and complex heavy metals. NTA removal was measured in four pilot septic tank-percolation field systems under normal and totally failed field conditions at initial concentrations of 0, 30 and 60 mg/l. Normally operating systems removed nearly 100 percent of the NTA while totally anaerobic (failed) systems discharged nearly 70 percent of the original NTA concentration into the groundwater. NTA removal in oxidation ponds was measured using four 360 gallon ponds and sewage containing NTA concentrations ranging from 0 to 100 mg/l. Biodegradability of NTA was greater than 90 percent for influent concentrations normally expected in sewage (0 to 30mg/l) but decreased to 50 percent for concentrations of 100 mg/l. Additional lab work was conducted to determine NTA removal by soil columns and anaerobic digesters. Aerobic soil columns removed nearly 95 percent of initial NTA concentrations of 40 and 100 mg/l while only 10-15 percent was removed under anaerobic conditions. Anaerobic digestion removed 8-13.6 percent of NTA concentrations from 15 to 60 mg/l. (SWF)

ACC# : L000668
AUTHOR: Bledsoe, B.; Kenyon, K.F.; Schaub, S.A.; Thomas, R.E.
AFFIL : U.S. Army Medical Bioengineering Research and Development Laboratory Fort Detrick, Frederick, Maryland and Robert S. Kerr Environmental Research Laboratory, U.S. Environmental Protection Agency, ADA, OK
TITLE : Evaluation of the Overland Runoff Mode of Land Wastewater Treatment for Virus Removal
SOURCE: Applied and Environmental Microbiology, 39(1) (8 pages)
YEAR : 1980
TEXT : The removal of enteric and tracer viruses by the overland runoff mode of domestic wastewater treatment was evaluated. Raw and primary and secondary treated wastewaters were sprayed onto grass-covered, 36m soil plots of fine, sandy loam overlying an impermeable clay subsoil. Tracer bacteriophage f2 was seeded into the applied wastewaters, which were subsequently sampled at several points along the length of the plots. Assay of effluent samples revealed modest tracer virus removals of 30 percent to 60 percent. Data from timed experiments indicated that advancement of tracer virus to the bottom of the slopes proceeded at the same rate as wastewater, reaching the plot effluents within 50 to 90 minutes after application. Indigenous enteric virus levels were reduced by approximately 68-85 percent during migration down the treatment slopes. Soil sampling revealed that, although some f2 virus was found associated with the wastewater-saturated topsoil, little penetration of

virus into the soil profile occured. Laboratory soil adsorption studies revealed that poliovirus I was adsorbed much more readily than f2 virus. Comparison of virus removal characteristics during overland runoff with chemical removal characteristics of wastewater did not reveal any obvious correlations that could be used to predict virus removal. (AU)

ACC# : L000669
AUTHOR: Attfield, H.D.
AFFIL : Volunteers in Technical Assistnce, 3706 Rhode Island Ave., Mt. Rainier, MD 20822
TITLE : Composting Privy
SOURCE: VITA Publications Service, 3706 Rhode Island Ave., Mt. Rainier, MD 20822 (13 pages)
TEXT : Guidelines for a Bangladesh privy that can be built worldwide are presented. Topics include digging the pit, preparing the floor, building the shelter, addition of other compost materials and moving locations when the pit is full. The paper is essentially a series of captioned illustrations which simplify instructions. (SWF)

ACC# : L000670
AUTHOR: Duffer, W.R.; Hulin, Jr., C.C.
AFFIL : U.S. EPA
TITLE : Potential of Aquaculture for Reclamation of Municipal Wastewaters
SOURCE: Water Reuse Symposium, Vol. 1 (7 pages)
YEAR : 1979
TEXT : An overview of aquaculture is given with an emphasis on wastewater. Production versus treatment processes are discussed along with current research areas and needs. (SWF)

ACC# : L000671
AUTHOR: Pisani, J.A.; Velterop, F.M.
AFFIL : Envirogenic Systems Company
TITLE : Open-Channel Ultrafiltration Spiral Module for Water Reuse
SOURCE: Water Reuse Symposium, Vol. 2 (7 pages)
YEAR : 1979
TEXT : A spiral-wound open-channel ultrafiltration membrane for use in wastewater reuse systems is described. The element combines two types of ultrafiltration concepts, spiral wound and tubular membrane, to produce a viable ultrafiltration device. Preliminary testing suggests it has industrial application in paper and pulp mills, and in textile and food processing plants. (SWF)

ACC# : L000672
AUTHOR: Huang, J.C.
AFFIl : University of Missouri-Rolla
TITLE : Toward the Goal of Direct Water Reuse - What Should We Do Next?
SOURCE: Water Reuse Symposium, Vol. 1 (9 pages)
YEAR : 1979
TEXT : Technical and psychological factors affecting direct water reuse progres are discussed. The author also lists steps he feels are needed to overcome the public's reluctance to reuse water. (SWF)

ACC# : L000673
AUTHOR: Weston, R.F.
AFFIl : Roy F. Weston Inc., Weston Way, West Chester, PA
TITLE : Management of On-Site and Alternative Wastewater Systems
SOURCE: Roy F. Weston, Inc. Weston Way, West Chester, PA (112 pages)
YEAR : 1979
TEXT : Basic management needs, functions, institutional arrangements, and dimensions related to on-site and alternative systems are described in this draft report. Several case study summaries are presented from a management viewpoint. Both community and state case study summaries are included. (SWF)

ACC# : L000674
AUTHOR: Parker, C.E.; Reynolds, J.W.
AFFIL : Dept. of Civil Engineering, University of Virginia and Perkins-Elmer Corp., respectively
TITLE : Closed Loop Recycle and Reuse of Water Closet Flush Water
SOURCE: Water Reuse Symposium, Vol. 3 (12 pages)
YEAR : 1979
TEXT : The field evaluation results of a recycle-reuse concept dealing with water closet flush water is presented. The adequacy of biological treatment for water recycled 10 to 20 times in a closed system is evaluated. The concept utilizes biological treatment by extended aeration followed by granular media filtration. Treatment provides acceptable water for flush reuse at the 95 percent recycle level. (SWF)

ACC# : L000675
AUTHOR: Ford, Jr., M.E.; Stokes, H.W.
AFFIL : Las Virgenes Municipal Water District and Boyle Engineering Corp., respectively
TITLE : The Application of Non-Potable Water Systems to Residential Service
SOURCE: Water Reuse Symposium, Vol. 3 (12 pages)
YEAR : 1979
TEXT : A non-potable water system for residential service was developed by the Las Virgenes, California, Municipal Water District. The system provides non-potable water derived from treated domestic wastewater for use in residential landscape irrigation. (SWF)

ACC# : L000676
AUTHOR: Mankes, R.O.
AFFIL : Pure Cycle Boulder, CO
TITLE : Pure Cycle Corporation - A Domestic Wastewater Recycling System
SOURCE: Proceedings of the Water Reuse Symposium, Vol. 1 (6 pages)
YEAR : 1979
TEXT : A domestic wastewater recycling system composed of five subassemblies was designed to treat and purify wastewater for reuse as potable water. The system uses aerobic and anaerobic digestion, ultrafiltration, activated carbon and ultraviolet disinfection. It is controlled and monitored by a microprocessor tied into a telephone line to the service center. This system eliminates the problem of building homes where water quality or quantity and/or on-site wastewater treatment is a problem. (SWF)

ACC# : L000677
AUTHOR: N/A
AFFIL : Domestic Engineers
TITLE : The Conservation, Care and Control of Water
SOURCE: Domestic Engineering Reprint, July 1978 (11 pages)
YEAR : 1978
TEXT : Examples of water conservation in the United States and basic water conservation policy are discussed. The benefit of employing water flow and water pressure reducers is explained. Limiting water pressure to 50 pounds per square inch was found to prevent premature appliance failure and reduced wasted water. An example of how to figure potential savings using water regulators is presented. (SWF)

ACC# : L000678
AUTHOR: Benedek, A.; Bromley, D.
AFFIL : James F. MacLaren Limited and McMaster University, respectively
TITLE : Reduction of Potable Water Demand in the Arctic by Reuse
SOURCE: Water Reuse Symposium, Vol. 2 (8 pages)
YEAR : 1979
TEXT : The use of a package-type sewage treatment plant for providing recycled water in the Arctic region is discussed in this paper. Pilot plant data show good COD and suspended solids removal. Recycled water can be sent back to the household and used as sewage conveyance water. Recycling systems are important in the Arctic because of the severe shortage of potable water sources and the sensitivity of receiving streams. (SWF)

ACC# : L000679
AUTHOR: Culp, R.L.; Haim, N.F.
AFFIL : Culp, Wesner, Culp Clean Water Consultants, El Dorado Hills, CA
TITLE : Field Manual for Performance Evaluation and Troubleshooting of Municipal Wastewater Treatment Facilities
SOURCE: NTIS, Springfield, VA (413 pages)
YEAR : 1978
TEXT : The intent of this manual is to serve as a technical field guide or reference document for use in improving the performance of municipal wastewater treatment plants. It will also provide a troubleshooting guide for identifying, analyzing and solving problems. Land application of wastewater is described, and design considerations are discussed. (AU/SWF)

ACC# : L000680
AUTHOR: Pacey, A.; ed.
AFFIL : Oxfam and the Ross Institute of Tropical Hygiene
TITLE : Sanitation in Developing Countries
SOURCE: John Wiley and Sons, Ltd. (240 pages)
YEAR : 1978
TEXT : This text is a compilation of papers presented at Pembroke College, Oxford, July 5-9, 1977. Four main themes are discussed: the relationship between sanitation and health; latrine technology; the implementation of improvements in excreta disposal; and the treatment

and recycling of wastes. The material is organized to provide a coherent perspective on each of these themes. (SWF)

ACC# : L000681
AUTHOR: Keeley, J.W. (Project Officer)
AFFIL : Robert S. Kerr Environmental Research Laboratory, Ada, Oklahoma
TITLE : Proceedings of the Fourth National Ground Water Quality Symposium
SOURCE: NTIS, Springfield, VA (180 p. text, 26 p. articles)
YEAR : 1978
TEXT : Nine topics, including land application of waste, were presented at this Minnesota conference. Three articles deal with land application of wastes: 1. "Land Application of Wastes-State of the Art" by R.R. Wright and C.K. Rovey (p 47-61). This brief overview of land application, and types of land treatment, site selection, sludge application and monitoring are included. Four case histories are discussed. 2. "Land Application of Wastes - An Important Alternative" by J.R. Shaeffer (p. 62-68). The performance, effects, technological advances, site specifications, and components of a land treatment system are presented. 3. "Land Application - An Accident Waiting to Happen" by C.C. Johnson Jr. (p. 69-72). The problem of possible groundwater contamination from land application of wastes is discussed. (SWF)

ACC# : L000682
AUTHOR: Perrine, R.L.
AFFIL : Environmental Science and Engineering, University of California, Los Angeles
TITLE : Institutional Barriers to Wastewater Reclamation and Reuse
SOURCE: Water Reuse Symposium, Vol. 2 (23 pages)
YEAR : 1979
TEXT : A study was conducted to identify and analyze the institutional problems relating to development of water reclamation and reuse projects in southern California. The report is based on case studies of projects in southern California. It suggests potential solutions to these problems so that future projects may be easier to review and implement. (SWF)

ACC# : L000683
AUTHOR: Klammt, G.
AFFIL : New Education Development Systems Inc., 1600 Aetna Springs Rd., Pope Valley, California 94567
TITLE : Integrated Systems Approach to Forest Wastewater Disposal
SOURCE: New Education Development Systems Inc., 1600 Aetna Springs Rd., Pope Valley, CA 94567 (19 pages)
YEAR : 1979
TEXT : The paper explains integrated systems management (ISM) as a holistic approach toward problem solving in developing resources for mankind. It can be applied to the improved design, construction and operation of wastewater facilities. The resulting wise use of resources and cost savings are demonstrated for a small California campground where water saving devices and soil disposal alternatives were used. (SWF)

ACC# : L000684
AUTHOR: Crites, R.W.; Griffes, D.A.; Pound, C.E.
AFFIL : Metcalf and Eddy Engineers, Palo Alto, California, EPA-technology Transf
TITLE : Land Treatment of Municipal Wastewater Effluent: Design Factors - I
SOURCE: Supt. of Documents, U.S. Govt. Printing Office, Washington D.C. (53 pages)
YEAR : 1976
TEXT : A publication of information presented at a series of EPA seminars covering basic design factors of land treatment systems. Topics covered are preapplication, land suitability, method selection, distribution techniques, storage, climatic factors, control of surface runoff, health concerns, and monitoring. Part one of a two-part series. (SWF)

ACC# : L000685
AUTHOR: Powell, G.M.
AFFIL : CH2M Hill, Denver Colorado, EPA-Technology Transfer
TITLE : Land Treatment of Municipal Wastewater Effluent: Design Factors - II
SOURCE: Supt. of Documents, U.S. Govt. Printing Office, Washington D.C., 76 p.
YEAR : 1976
TEXT : This second of a two-part series resulting from EPA seminars features a review of land application processes and factors influencing the identification and selection of land application sites. Effluent loading constraints, effluent loading design, and alternative land application components and operations are then discussed. Emphasis is given to the design of a suitable loading rate and to requirements for drainage, field investigations, monitoring systems, crop selection, irrigation schedules, and farm management. (AU/SWF)

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ACC#   : L000686
AUTHOR: Ciccioli, P.; Cooper, W.T.; Hammer, P.M.; Hayes, J.M.
AFFIL  : Depts. of Chemistry and Geology, Indiana University, Bloomington, Indian
         47405
TITLE  : Organic Solute-Mineral Surface Interactions:  A New Method for the
         Determination of Groundwater Velocities
SOURCE: Water Resources Research, 16(1)  (7 pages)
YEAR   : 1980
TEXT   : Laboratory studies involving limestone and sand columns indicate
         that certain organic compounds could be used to determine groundwater
         movement without being subject to tracer retardation due to strong
         tracer-mineral reactions.  Selected compounds were members of series
         whose interaction energies vary regularly.  Tracers were found to behave
         as expected.  Interaction was a function of polarizability. (SWF)

ACC#   : L000687
AUTHOR: Sauar, D.K.
AFFIL  : University of Wisconsin-Madison
TITLE  : Intermittent Sand Filtration of Septic Tank and Aerobic Unit Effluents
         Under Field Conditions
SOURCE: University of Wisconsin-Madison  (243 pages)
YEAR   : 1975
TEXT   : The field performance of intermittent sand filtration for septic tank
         and aerobic unit effluents was evaluated.  Both systems met or exceeded
         effluent standards for BOD, COD and suspended solids; however,
         disinfection of both effluents was required to meet bacteriological
         standards.  Loading rates of 3.5 gpd/sq ft for aerobic unit effluent and
         5 gpd/sq ft for septic tank effluent were found to produce acceptable
         effluent quality although ponding occurred.  A detailed cost analysis
         was presented for each system based on both a 50 and 100 sq ft filter
         bed area. (SWF)

ACC#   : L000688
AUTHOR: Seagraves, J.A.
AFFIL  : Department of Economics and Business, North Carolina State University,
         Raleigh, North Carolina
TITLE  : Industrial Waste Strength Charges:  A Review
SOURCE: Wastewater Management in Rural Communities:  A Socioeconomic Perspective
         Information Report 103, Institute for Research on Land Use and Water
         Resources, Pennsylvania State University, University Park, PA: 129-141
         (12 pages)
TEXT   : Incentive schemes for industrial water consumption and waste reduction
         are based on a system of charges or permits.  This topic is discussed
         under three main headings; the effect of waste strength charges; the
         role of grants to cities; and combinations of permits and charges. (SWF)

ACC#   : L000689
AUTHOR: Libby, L.W.; Parsch, L.D.
AFFIL  : Department of Agricultural Economics, Michigan State University
TITLE  : Agriculture and 208 Planning:  The Crunch is Coming
SOURCE: Wastewater Management in Rural Communities:  A Socio-Economic Perspectiv
         Information Report 103, Institute for Research on Land Use and Water
         Resources, Pennsylvania State University, University Park, PA: 143-154
         (11 pages)
YEAR   : 1979
TEXT   : Presents major institutional economic research needs relative to
         implementation of water quality plans conducted under Section 208 of the
         1972 Amendments to the Federal Water Pollution Control Act.  The
         emphasis is on nonpoint pollution.  The economic implications of
         alternative control techniques are discussed through a review of several
         recent studies. (SWF)

ACC#   : L000650
AUTHOR: Baker, F.G.; Bouma, J.
AFFIL  : University of Wisconsin - Madison and Soil Survey Institute, Wagenigan,
         The Netherlands, respectively
TITLE  : Measurement of Soil Hydraulic Conductivity and Site Selection for Waste
         Disposal
SOURCE: Individual Onsite Wastewater Systems - Proceedings of the Second
         National Conference, Ann Arbor Science Publishers, Inc., P.O. Box 1425,
         Ann Arbor, MI  48106  (11 pages)
YEAR   : 1975
TEXT   : Discusses measurement of the hydraulic conductivity of soils as a
         factor in determining the placement of soil absorption fields.
         Discusses the MSTU measurement of soil by the crust test, the
         variability of hydraulic conductivity in specific soil series and the
         use of this information for site selection of septic tank-soil
         absorption systems. (SWF)
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ACC# : L000691
AUTHOR: Stead, P.A.
AFFIL : Portsmouth Polytechnic
TITLE : The Potential of Composting Admixtures of Sewage Sludge and Domestic Refuse
SOURCE: Water Pollution Control, Vol. 77 (5 pages)
YEAR : 1978
TEXT : Discusses composting mixtures of non-industrial sludge and domestic refuse as a viable waste disposal alternative. Composting produces a stable, less-toxic end product usable in agriculture and horticulture. Includes a comparison of composting methods used at three industrial plants and one pilot unit. (SWF)

ACC# : L000692
AUTHOR: Corson, S.L.
AFFIL : N/A
TITLE : Wastewater Treatment Issues: Little Cranberry Island
SOURCE: N/A (15 pages)
YEAR : 1978
TEXT : Individual straight-pipe discharge of domestic wastes into the tidewater of the Cranberry Isles is in violation of the State of Maine's implementation of the federal water pollution laws. This report describes efforts to comply with the uniform statewide application of technology-based effluent standards. The report suggests compliance may result in treatment for treatment's sake and urges that the assimilative capacity of the receiving waters be further studied with the goal of working out a reasonable course of action. (AU)

ACC# : L000693
AUTHOR: Bouma, J.
AFFIL : Soil Survey Institute, Wageningen, The Netherlands
TITLE : Improved Field Techniques for Measurement of Hydraulic Properties of Soi
SOURCE: Water Pollution Control in Low Density Areas - Proceedings of A Rural Environmental Engineering Conference, University Press of New England (9 pages)
YEAR : 1975
TEXT : Discusses the determination of soil suitability for the disposal of septic-tank effluent on the basis of soil percolation rate. The double-tube method and the crust test are two "in-situ" field tests developed to measure hydraulic conductivity in saturated and unsaturated soils. Measurement of hydraulic conductivity precedes prediction of flow conditions in the soil. An appendix describes the crust test procedure for in-situ measurements of hydraulic conductivities in unsaturated soil. (SWF)

ACC# : L000694
AUTHOR: Grass, T.E.
AFFIL : N/A
TITLE : Protecting Ground Water From Domestic Wastewater Effluent
SOURCE: Water Well Journal, June 1977 (2 pages)
YEAR : 1977
TEXT : Presents formula to determine the minimum horizontal protective distance between water supply wells and nearest point of wastewater effluent discharge. Protective distance insures adequate purification of effluent before reaching groundwater. (SWF)

ACC# : L000695
AUTHOR: Cuneo, K.
AFFIL : Madrone Associates, Box 2970, San Rafael, CA 94902
TITLE : Water Conserving Gardening
SOURCE: Marin Municipal Water District, 220 Nellen Avenue, Corte Madera, CA 94925 (15 pages)
YEAR : 1978
TEXT : Presents in popular style several methods to reduce garden water consumption for Mediterranean-type climates. Careful planning, planting and watering of plants is essential for growth and water conservation. Includes list of drought-resistant and drought avoiding plants suitable to Marin County, California. (SWF)

ACC# : L000696
AUTHOR: Ferrell, D.M.
AFFIL : Illinois Interagency Water Management/Conservation Committee
TITLE : Wise Water Use Means Dealer Profits
SOURCE: National Home Center News, 4(16) (1 page)
YEAR : 1978
TEXT : Presents ideas for retailers to promote awareness of water-saving devices. Ideas include detection of toilet leaks using foodcoloring

tablets, sponsoring "Fix a Leak Week" and special displays of water-saving devices. Includes informative reasons for water conservation. (SWF)

ACC# : L000697
AUTHOR: N/A
AFFIL : N/A
TITLE : Wise Water Use is Good for the System
SOURCE: Illinois Interagency Water Management/Conservation Committee, Springfield, Illinois (3 pages)
TEXT : Flyer presents several reasons why water conservation is important. Includes address for additional information on water-saving tips. (SWF)

ACC# : L000698
AUTHOR: N/A
AFFIL : N/A
TITLE : Symposium on Impacts on Rural America of the Federal Water Pollution Control Act Amendments, P.L. 92-500
SOURCE: USDA Economics, Statistics and Cooperatives Service (55 pages)
YEAR : 1977
TEXT : Papers deal with some of the actual and potential impacts on rural America of P.L. 92-500, Amendments to the Federal Water Pollution Control Act. Topics discussed include municipal wastewater treatment, agricultural processing plant location and cost recovery, and control of plant nutrients, erosion, and sedimentation. Discussants point to the need for better planning, realistic management approaches, and "ethically inspired voluntarism" to help economists contribute to environmental policy formulation. (AU)

ACC# : L000699
AUTHOR: N/A
AFFIL : California State Water Resources Control Board
TITLE : Public Management of On-Site Wastewater Systems - An Explanation of Senate Bill 430
SOURCE: State Water Resources Control Board, Box 100, Sacramento, CA (12 pages)
YEAR : 1978
TEXT : Explains California's Senate Bill 430, which became effective January 1, 1978. It enables qualified public agencies to manage individual on-site wastewater devices, including septic systems. Such agencies can create on-site wastewater management zones in which they can have zoned inspection and enforcement powers. (SWF)

ACC# : L000700
AUTHOR: N/A
AFFIL : Comptroller General of the United States
TITLE : Community-Managed Septic Systems - A Viable Alternative to Sewage Treatment Plants - Report to the Congress
SOURCE: U.S. General Accounting Office, CED-78-168
YEAR : 1978
TEXT : Using a number of illustrative case studies, this GAO report concludes that septic systems can function as effectively and as permanently as central facilities and are generally more cost-effective. It takes issue with EPA's perception of septic systems as a temporary means of domestic wastewater disposal and finds that their seeming unreliability and frequent failures are caused by improper siting or installation, or ineffective management and operation. It suggests several strategies to encourage septic tank upgrading and management through public management agencies. (SWF)

ACC# : L000701
AUTHOR: Weigand, R.G.
AFFIL : Wood County-Parkersburg Health Dept., Parkersburg, WV
TITLE : Performance of Alternative On-Site Sewage Systems in Wood County, West Virginia
SOURCE: Journal of Environmental Health, 42(3) (5 pages)
YEAR : 1979
TEXT : Alternatives to the septic tank-soil absorption sewage disposal system implemented in Wood County, West Virginia, are compared. The different designs include two types of evapotranspiration mounds, shallow trench and dual bed leach fields, evapotranspiration beds, Wisconsin (fill) mounds, and filter beds. In 1978, 65 systems were surveyed and tables were prepared showing operational information and failure rates. Probable causes for each failure were determined by comparing conditions, maintenance, installation, site selection, and system size. (SWF)

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ACC#  : L000702
AUTHOR: Lamb, G.L.; Ripley, P.G.
AFFIL : Dravo Corp., Pittsburgh, PA
TITLE : Filtration of Effluent from a Biological-Chemical System
SOURCE: Water and Sewage Works, 120(2)  (4 pages)
YEAR  : 1973
TEXT  : A deep bed, coarse-grained sand filter was used to polish the effluent
        of a biological treatment plant.  Results indicate that the filters are
        effective in removing suspended solids, phosphorous and turbidity at
        filtration rates up to 16 gpm/square feet using molar
        aluminum-to-phosphorous ratios of 2.3:1 to 4.8:1. (SWF)


ACC#  : L000703
AUTHOR: Tjiook, T.K., Jr.
AFFIL : N/A
TITLE : Community Water Supply and Sanitation:  Basis to Rural Development
SOURCE: International Conference on Transfer of Technology  (12 pages)
YEAR  : 1976
TEXT  : Discusses the creation of community water supply and sanitation systems
        for rural populations in developing countries.  True systems have been
        shown to stimulate overall community development and social progress. (S


ACC#  : L000704
AUTHOR: Andreoli, A.; Bartilucci, N.; Forgione, R.; Reynolds, R.
AFFIL : Suffolk County Department of Health Services and William F.
        Cosulich Associates, P.C.
TITLE : Nitrogen Removal in Modified Subsurface Sewage Disposal System
SOURCE: Water Reuse Symposium, Vol. 2  (16 pages)
YEAR  : 1979
TEXT  : A system for nitrogen removal from septic tank leachate was studied
        by the Suffolk County Department of Health Services, Long Island,
        New York.  The study encompassed the design, construction and oper-
        ation of a full-scale system consisting of a septic tank-leaching
        field wastewater disposal system combined with a subsurface system
        natural soil treatment mechanisms.  The system reduced nitrogen
        concentrations by an average of 95 percent. (SWF)


ACC#  : L000705
AUTHOR: Colt, J.E.; Smith, R.G.; Tchobanoglous, G.; Vigil, S.A.
AFFIL : Department of Civil Engineering, University of California
TITLE : An Integrated System Employing Alernative Technologies for Liquid
        and Solid Waste Management for Intermediate and Small Communities
SOURCE: National Conference on Environmental Engineering  (6 pages)
YEAR  : 1979
TEXT  : The use of alternative technologies in the development of integrated
        systems for wastewater management for intermediate and small com-
        munities is described.  Discusses the use of aquaculture, land treat-
        ment and gasification systems and their interrelationship in an
        integrated wastewater management system. (SWF)


ACC#  : L000706
AUTHOR: Barnhill, K.G.; Caldwell, S.M.; Ditman, W.D.; Russel, J.S.
AFFIL : Wapora, Inc., Washington, D.C.
TITLE : Water Use and Conservation at Federal Facilities in the Washington,
        D.C. Metropolitan Area
SOURCE: U.S. Environmental Protection Agency, Region III, 6 and Walnut St.,
        Philadelphia, PA  20015  (107 pages)
YEAR  : 1978
TEXT  : A study conducted on water use for federal buildings in the Washington
        D.C., metropolitan area revealed that projected water conservation
        techniques could save approximately 10 percent of the amount used
        presently.  Although this savings constitutes only one percent of the
        total water use in the area, it was concluded that the federal govern-
        ment should take a positive step toward water conservation by devel-
        oping a water monitoring and management plan.  Included in the report
        are case studies, various water conservation legislation, an inven-
        tory of water-saving devices and management concerns. (SWF)


ACC#  : L000707
AUTHOR: N/A
AFFIL : N/A
TITLE : The Farallones Institute Creating Tools for a Convivial Society
SOURCE: The Farallones Institute, The Integral Urban House, 1516 Fifth St.,
        Berkeley, CA  94710  (44 pages)
YEAR  : 1978
TEXT  : This is the 1978 Annual Report of the Farallones Institute, organized
        to provide technical assistance and information on small-scale renewable
        resource systems.  One area of interest deals with investigating alter-
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natives for domestic waste management. These options are evaluated in terms of environmental protection, water conservation, simplistic utilization and economic viability. Options studied include waterless composting toilets, water seal toilets and land application of treated effluent. (SWF)

ACC# : L000708
AUTHOR: Burton, T.E.; King, D.L.
AFFIL : Institute of Water Research, Michigan State University
TITLE : A Combination of Aquatic and Terrestrial Ecosystems for Maximal Reuse of Domestic Wastewater
SOURCE: Water Reuse Symposium, Vol. 1 (13 pages)
YEAR : 1979
TEXT : The Michigan State University Water Quality Management Facility is a field-scale wastewater treatment research facility. It consists of a series of four presumably aerobic ponds followed by spray irrigation on crop or forest lands. Phosphorus is removed from the secondary effluent algae in the ponds and by sorption to the soil bottom. Much of the nitrogen is lost as ammonia gas. In addition, nitrogen is also removed by algae. Removal of the remaining phosphorus and nitrogen by land application was also investigated with results dependant on the typ of flora. (SWF)

ACC# : L000709
AUTHOR: Lee, M.K.; Reuter, L.H.
AFFIL : Life Systems Inc. and U.S. Army Medical Bioengineering Research and Development Laboratory
TITLE : Multipurpose Water Treatment System Development
SOURCE: Water Reuse Symposium, Vol. 2 (34 pages)
YEAR : 1979
TEXT : The design, configuration and operation of a wastewater reuse system is described. The U.S. Army Medical Research and Development Command developed this system for use by combat units in waterless areas. The Water Processing System pilot plant consists of four units: a water treatment unit, a water purification unit, an ultraviolet/ozone oxidation unit and an automatic instrumentation unit. The system treats non- sanitary wastewaters for nonpotable reuse or for surface discharge to the environment. It purifies natural fresh or brackish waters for potable use. Photographs and diagrams of the system are included. (SWF)

ACC# : L000710
AUTHOR: Bouma, J.; Tanner, C.B.
AFFIL : University of Wisconsin-Madison and Soil Survey Institute, Wageningen, The Netherlands, respectively
TITLE : Influence of Climate on Subsurface Disposal of Sewage Effluent
SOURCE: Individual Onsite Wastewater Systems - Proceedings of the Second National Conference, Ann Arbor Science Publishers, Inc., P.O. Box 1425, Ann Arbor, MI (12 pages)
YEAR : 1975
TEXT : Discusses effect of climate on evapotranspiration (ET). Precipitation falling on a disposal field adds to the effluent volume; therefore, precipitation must be considered along with evapotranspiration in calculating a disposal requirement. Disposal requirement and the net difference between ET and precipitation determines the effectiveness of ET for on-site effluent disposal. Includes both discussion of variables which effect ET and a sample calculation of maximum soil ET in Eastern United States. (SWF)

ACC# : L000711
AUTHOR: Corey, R.B.; Olotu, M.U.; Tyler, E.J.
AFFIL : University of Wisconsin-Madison
TITLE : Potential Effects of Water Softener Use On Septic Tank - Soil Absorption On-Site Waste Water Systems
SOURCE: University of Wisconsin-Madison (73 pages)
TEXT : The potential effects on hydraulic conductivity of soil absorption fields and bacterial activity in septic tanks from water softener regeneration were examined. The addition of water softener regeneration wastes to soil absorption systems was found to be a minor problem since the hydraulic conductivity of the soil did not drop below 85 percent of the maximum saturation level. The presence of salts from the water softener had no deleterious effect on osmotic potential difference between the wastewater and the bacteria in the septic tank, allowing proper microbial growth. (SWF)

ACC# : L000712
AUTHOR: Farrell, R.P.
AFFIL : Environment/One Corp., Schenectady, NY 12309

TITLE : Residential Pressure Sewers Using Grinder Pumps Reduce Energy Consumption During Construction and Operation
SOURCE: Conference on Energy Optimization of Water and Wastewater Management for Municipal and Industrial Applications. Sponsored by U.S. Dept. of Energy and hosted by Argonne National Laboratory, New Orleans, LA, Dec. 10-13, 1979 (8 pages)
YEAR : 1979
TEXT : This paper compares costs of low pressure wastewater collection systems to gravity type systems from the standpoint of energy consumption, construction and operation. The primary comparisons, in tabular form, include sewer pipe material usage, energy for earth work removal, relative labor requirements, pumping energy requirements, and electricity consumption. (SWF)

ACC# : L000713
AUTHOR: Meyer, W.J.
AFFIL : Virginia Department of Health, Richmond, VA
TITLE : Research Needs for Disposal of Wastewater in Soil
SOURCE: Individual Onsite Wastewater Systems - Proceedings of the First National Conference, Ann Arbor Science Publishers, Inc., P.O. Box 1425, Ann Arbor, MI 48106 (6 pages)
YEAR : 1977
TEXT : The limitations of various types of research as they apply to on-site wastewater disposal are briefly discussed. The author calls for a systematic evaluation of soil disposal for wastewater and possible alternatives. (SWF)

ACC# : L000714
AUTHOR: Williams, T.C.
AFFIL : Williams and Works, Inc., Grand Rapids, MI 49506
TITLE : You Broke My Cookies
SOURCE: Individual Onsite Wastewater Systems - Proceedings of the Fourth National Conference, Ann Arbor Science Publishers, Inc., P.O. Box 1425, Ann Arbor, MI 48106 (4 pages)
YEAR : 1977
TEXT : The problems that consulting engineers face with the EPA grants program and the unwillingness of the regulatory agencies to consider approval of alternatives are discussed along with suggestions for improvement. (SWF)

ACC# : L000715
AFFIL : James F. MacLaren, Ltd., Toronto, Canada
TITLE : Some Recent Developments in Shallow-Buried Water and Sewage Systems
SOURCE: AWWA Atlantic Canada Section Conference '77, Moncton, New Brunswick, Canada (18 pages)
YEAR : 1977
TEXT : Three types of insulation for shallow-buried pressure sewers and water systems, the Frost-Box, Frost Cover, and Pre-insulated and Electrically Treated Pipe are described. Incentives and constraints of shallow-buried systems are discussed and four brief description of recent related projects are included. Also, a cost analysis and design examples of a pressure sewer system for a small community in rocky terrain is presented. Capital, operation and maintenance, and houseowner cost determinations are included. (SWF)

ACC# : L000716
AUTHOR: Lewis, A.L.; Mountain, C.W.; Wellings, F.M.
AFFIL : Epidemiology Research Center, Tampa, Florida
TITLE : The Fate of Virus in Florida Soils Following Secondary Effluent Spray Irrigation
SOURCE: Individual Onsite Wastewater Systems - Proceedings of the First National Conference, Ann Arbor Science Publishers, Inc., P.O. Box 1425, Ann Arbor, MI 48106 (4 pages)
YEAR : 1977
TEXT : Under the threat of drought, the city of St. Petersburg, Florida, initiated spray irrigation of wastewater on public and private lands to conserve potable water supplies. Studies to determine the feasability of this system included viral analysis of subsurface water from wells. Results indicate that viruses can survive percolation through 10-20 feet of soil. (SWF)

ACC# : L000718
AUTHOR: McClelland-NI (editor)
AFFIL : National Sanitation Foundation
TITLE : Individual Onsite Wastewater Systems - Proceedings of the First National Conference, 1974
SOURCE: Individual Onsite Wastewater Systems - Proceedings of the First National Conference, Ann Arbor Science Publishers Inc., P.O. Box 1425, Ann Arbor,

MI 48106 (156 pages)
YEAR : 1977
TEXT : Twent-three leading authorities examine major aspects of the subject including rural wastewater problems, soil infiltration and evapotranspiration, pretreatment, surface discharge and viral contamination. The book gives detailed coverage problems of conflicting regulations and enforcement practices between municipal codes, state regulations and EPA guidelines. Special attention is paid to Public Law 92-500 and its effect on individual onsite wastewater systems. (EDITOR)

The proceedings include the following articles: Keynote Address. Regional Aspects of Water Quality Management Planning - Or, The Federal Water Pollution Control Act as it Relates to Individual Onsite Wastewater Systems; Community vs. Individual Wastewater Systems; Research Needs for Disposal of Wastewater in Soil; NSF: Its Role in Defining and Coordinating Objectives; EPA Programs and Policies; Current Status of State Regulations (Michigan); Current Status of State Regulations (Virginia); Current Status of State Regulations (Pennsylvania); Current Status of State Regulations (Ohio); Treatment and Disposal of Wastewater from Homes by Soil Infiltration and Evapotranspiration. (SWF)

ACC# : L000719
AUTHOR: Dearth, K.H.
AFFIL : Office of Water Program Operations, U.S. EPA
TITLE : The Impact of the Clean Water Act of 1977 on Funding of Individual Wastewater Systems
SOURCE: Individual Onsite Wastewater Systems - Proceedings of the Fifth National Conference, Ann Arbor Science Publishers, Inc., P.O. Box 1450, Ann Arbor, MI 48106 (5 pages)
YEAR : 1978
TEXT : Presents key provisions of the Clean Water Act of 1977 which allocate funding for individual wastewater systems. The act establishes a special program within the construction grants program to fund individual systems. Three new funding are explained: 1. Individual systems, as alternative systems to conventional gravity sewers and central treatment, are eligible for 85 percent grants. 2. Two percent of a state's allocation is set aside for this 10 percent increment from fiscal year (FY) 1979 and FY-1980, and 3 percent from FY-1981. These funds must be used, or the state's remaining funds will be reallocated to the states that have expended all their funds. 3. Four percent of each rural state's allotment is set aside for alternative systems in communities of up to 3,500 persons, or highly disposed sections of larger municipalities. In rural states these funds shall be reallocated, if not obligated, during the allotment period. (SWF)

ACC# : L000720
AUTHOR: Hayes, R.B.; Zickefoose, C.
AFFIL : Stevens, Thompson and Runyan, Inc., Portland, Oregon
TITLE : Stabilization Ponds - Operations Manual
SOURCE: NTIS, Superintendent of Documents, Government Printing Office, Washington, D.C. (81 pages)
YEAR : 1977
TEXT : Manual contains basics for those wishing to brush up on fundamentals or get acquainted with types of ponds, terminology and factors to consid in operation. It considers sampling, flow control and use of information gained from either visual, nasal or laboratory investigation. Housekeeping and day-to-day activities are presented along with a suggested checklist, which can be adapted for the individual plant. The manual presents a number of potential problems and gives solutions that other operators have found to be helpful. Major points are given on safety. (AU)

ACC# : L000721
AUTHOR: Henning, J.A.; Marshack, R.A.; Olsen, B.H.; Rigby, M.G.
AFFIL : University of California, Irvine
TITLE : Educational and Social Factors Affecting Public Acceptance of Reclaimed Water
SOURCE: Water Reuse Symposium, Vol. 2 (9 pages)
YEAR : 1979
TEXT : Survey results of knowledge of and attitudes toward use of reclaimed water are presented. Study populations were randomly selected from the City of Irvine, California, which is actively involved in water reclamation projects, and the City of Anaheim which is not. Results showed public acceptance of reclamation projects was dependent on educational level, sex, familiarity with reclamation programs, psychological variables and economic benefits to individual and community. (SWF)

ACC# : L000722

AUTHOR: Baker, F.G.; Bouma, J.; Veneman, P.L.M.
AFFIL : Life Sciences, University of Wisconsin-Madison
TITLE : Measurement of Water Movement in Soil Pedons Above the Water Table
SOURCE: Geological and Natural History Survey, University of Wisconsin-Extension (124 pages)
YEAR : 1974
TEXT : Detailed discussion of water movement and associated soil morphological features in soil pedons above the water table. Attention is confined to the occurrence of water in the soil and to water movement in unsaturated soil. Presents a simplified, non-mathematical approach to the description of soil water flow phenomena. Includes a thorough description of methods, availabity of certain components, descriptions and pictures of components and procedures. (SWF)

ACC# : L000723
AUTHOR: Goldstein, S.N.
AFFIL : National Water Demonstration Project, Conset, Inc., Washington, D.C.
TITLE : Community vs. Individual Wastewater Systems
SOURCE: Individual Onsite Wastewater Systems - Procedings of the First National Conference, Ann Arbor Science Publishers, Inc., P.O. Box 1425, Ann Arbor, MI 48106 (8 pages)
YEAR : 1977
TEXT : Recent economic studies comparing community and individual wastewater systems are reviewed. Individual systems were found to be less expensiv for populated areas. Other topics include a detailed explanation of an economic model used to determine savings of individual vs. community systems. Emphasis is placed on proper management of either type of facility for effective treatment. (SWF)

ACC# : L000724
AUTHOR: Bouma, J.; Hole, F.D.
AFFIL : Wisconsin Geological and Natural History Survey and Department of Soil Science, University of Wisconsin-Madison
TITLE : Soil Structure and Hydraulic Conductivity of Adjacent Virgin and Cultivated Pedons at Two Sites: A Typic Argindoll (silt loam) and a Typic Entrochrept (clay)
SOURCE: Soil Science Society of America Proceedings, 35(2) (4 pages)
YEAR : 1971
TEXT : This study's findings deal with soil morphology and hydraulic conductivity of the principal soil horizons of paired virgin and cultivated soil pedons at two sites. The purpose of this study was to characterize adjacent virgin and cultivated soil pedons and horizons by their capacity to transmit water under saturated conditions and to relate observed differences in soil behavior due to soil structure and to management factors. This study indicates that soil management-induced structural changes can strongly alter the hydraulic properties of a soil. (SWF)

ACC# : L000725
AUTHOR: N/A
AFFIL : Dewbury, Nealon and Davis, Consulting Engineers, Fairfax, VA.
TITLE : Alternatives to Public Sewer
SOURCE: National Association of Home Builders, 15th and M Streets N.W., Washington, D.C. 20005 (100 pages)
YEAR : 1975
TEXT : An overview of alternative sewage collection, treatment and disposal systems for large and small housing projects and for individual dwelling is given in this manual. On-site alternatives, vacuum and pressure sewer systems, wastewater characteristics and flows, in-house waste reduction and recycle practices, and septage handling are covered along with their cost. (SWF)

ACC# : L000726
AUTHOR: Gannon, J.E.
AFFIL : State University Research Center, Oswego, N.Y.
TITLE : Household Wastewater Management
SOURCE: Water Quality in the Salmon River Area (8 pages)
TEXT : This booklet has been prepared so that residents of the Salmon Rivers Region in New York may better understand the relationship between the management of household wastewater and water pollution. An overview of nutrient enrichment and early methods of wastewater treatmen is given. The functions of a septic tank and leach field are described and suggestions for improving septic system effectiveness are highlighted. The need for wastewater planning is emphasized. Includes descriptions of on-site alternatives to septic systems. (SWF)
CON : Office of Publications and College Press of SUNY, Oswego, NY

ACC# : L000727

AUTHOR: Garg, B.M.
AFFIL : Dept. of Environmental Resources, Commonwealth of Penn.
TITLE : Sewerage Manual (draft)
SOURCE: Penn. Dept. of Environmental Resources, Bureau of Water Quality Management, P.O. Box 2063, Harrisburg, PA. 17120 (128 pages)
YEAR : 1979
TEXT : The procedure for obtaining a sewerage permit and the standards for sewerage facilities in Pennsylvania are presented in this manual. Guidelines and regulations that govern engineering procedures and reports, design of sewers, pumping stations, conventional and advanced treatment and disposal works are listed in detail. Certain aspects of small flows technology such as intermittent sand filters and pressure sewers are covered. (SWF)

ACC# : L000728
AUTHOR: Alsten, C.R.; Mendola, D.; Serfling, S.A.; Stewart, W.C.
AFFIL : Applied Aquatic Resources Institute/Solar Aqua System, Inc.
TITLE : Wastewater Reclamation
SOURCE: Water Reuse Symposium, Vol. 1 (15 pages)
YEAR : 1979
TEXT : This paper presents results obtained during a year's operation of an experimental demonstration faciliy in California using the Solar AquaCell process. The system consisted of five ponds operated in series. The first two ponds were anaerobic and served basically as sedimentation basins. Pond three was facultative and, like pond two, contained vertically hanging Bio-Web substrates. Pond three was aerated as were ponds four and five. The final two ponds contained floating plants and served to provide advanced treatment. The fifth pond was followed by a slow sand filter.

A greenhouse enclosed all ponds to provide insulation and transfer of solar heat for plant utilization. The anaerobic stage reduced raw sewage BOD of 49 percent and 88 percent, respectively. BOD and TSS declined with increased retention time. Water hyacinths provided BOD and TSS levels below 5 ppm with 4.5 days retention time. Nitrogen removal by the AquaCell system averaged 90 percent. (SWF)

ACC# : L000729
AUTHOR: MacDonald, B.N.
AFFIL : Committee on Environmental Programs and Projects, League of Women Voters of the United States
TITLE : The Impact of Onlot Systems on Land Development: A Citizen's View
SOURCE: Individual Onsite Wastewater Systems - Proceedings of the Second National Conference, Ann Arbor Science Publishers, Inc., P.O. Box 1425, Ann Arbor, MI 48106 (5 pages)
YEAR : 1977
TEXT : In response to population growth and land use questions, the author presents the view of a citizen action group regarding governmental and citizen responsibilites towards on-lot systems. The topic of expanding urbanization and its sewering needs are discussed. Questions that arise from land development issues of on-lot systems vs. interceptor sewers as they relate to the present and future are presented and analyzed. (SWF)

ACC# : L000730
AUTHOR: Lydholm, B.; Nielson, A.L.
AFFIL : Royal Veterinary and Agricultural University, Copenhagen, Denmark
TITLE : Methods for Detection of Virus in Wastewater Applied to Samples from Sma Scale Treatment Systems
SOURCE: Water Research, 14(2):169-173 (5 pages)
YEAR : 1980
TEXT : Two small scale treatment systems were investigated to evaluate their effect on indigenous viruses in wastewater. In the effluent from an emscher tank system, treating a mixture of outlet from toilet, bath and kitchen, virus was found consistently. Samples were taken from a pasteurization plant where the sewage from toilets was treated by addition of formaldehyde and exposure to 76 degrees Celsius for 30 min. A few samples from the sewage were positive, but no virus was found in the effluent. A comparison was made of four methods to detect viruses in wastewater. Alum precipitation followed by tris elution, acidic precipitation followed by elution with beef extract and two-phase concentration all made it possible to isolate indigenous viruses from wastewater and gave comparable results. No virus was found by direct inoculation. This corresponds well with the findings that the content of virus was so low as to require concentration to be demonstrable. (AU)

ACC# : L000731
AUTHOR: Watson, D.C.
AFFIL : North West Water Authority

TITLE : The Survival of Salmonellae in Sewage Sludge Applied to Arable Land
SOURCE: Water Pollution Control - Part 1 (8 pages)
YEAR : 1980
TEXT : Digested sludge containing salmonellae was applied to arable land to determine organism survival under natural conditions. Samples were taken weekly for ten weeks during two consecutive summers. Two soil types were used and variations in temperature and rainfall were noted. The results show similar survival rates with no detectable bacterial concentration for eight weeks following sludge application. Organic soil compared to sandy soil was found to enhance bacterial survival while variations in temperature and rainfall did not significantly affect the survival rate. Survival time was found to be dependent on initial salmonellae concentration in sludge and the environmental conditions to which the organisms were exposed. (SWF)

ACC# : L000732
AUTHOR: Smith, S.A.; Wilson, J.C.
AFFIL : CH2M/Hill, Redding California
TITLE : Trucked Wastes: More Uniform Approach Needed
SOURCE: Water and Wastes Engineering, 10(3) (6 pages)
YEAR : 1973
TEXT : Factors affecting the addition of septic tank sludge (septage), vault wastes, portable chemical toilet wastes, and low-volume flush wastes to a waste treatment process such as an activated sludge plant ar discussed. These practices will upset plant performance and operation and must be considered in the design of a waste treatment facility. Waste strength is the most critical factor. A case history involving design of a .5 mgd modified activated sludge plant that will incorporate septage is described. (SWF)

ACC# : L000733
AUTHOR: Cogley, D.; Eaton, Jr., J.C.; Foy W.; Light, W.; Mason, M.
AFFIL : Walden Division of Abcor, Inc/U.S. Army Medical Bioengineering Research and Development Laboratory/Consultant to Walden Division of Abcor, Inc.
TITLE : Evaluation of Health Effects Data on the Reuse of Shower and Laundry Waters by Field Army Units
SOURCE: Water Reuse Symposium, Vol. 3 (17 pages)
YEAR : 1979
TEXT : This paper discusses the possibility of shower and laundry water reuse by field Army units. Evaluations were made of four units to assess health effects of water reuse. The treatment processes of the four units were as follows:

1. ultrafiltration-reverse osmosis,
2. ultrafiltration,
3. diatomaceous earth filter or dissolved air flotation followed by activated carbon and ion-exchange, and
4. powdered carbon and polyelectrolyte addition, hypochlorination, pressure diatomite filter.

Results show the system consisting of ultrafiltration and reverse osmosis provides a higher quality reuse water compared to the others. Concentration reductions of organic and inorganic chemicals commonly found in shower and laundry wastewater were consistantly lower for the UF-RO system. Results indicate it is possible to treat and reuse shower and laundry waters without any significant health effects. (SWF)

ACC# : L000734
AUTHOR: Otis, R.J.
AFFIL : Small Scale Waste Management Project, University of Wisconsin, Madison, WI
TITLE : An Alternative Public Wastewater Facility for a Small Rural Community
SOURCE: Rural Systems Engineers, Madison, WI (80 pages)
YEAR : 1978
TEXT : A history of a study conducted by the Small Scale Waste Management Project to determine a cost-effective solution to water pollution for a sanitary district in Westboro, Wisconsin. Cost effective evaluations of both conventional and alternative wastewater treatment systems and effectiveness in maintaining water quality were primary determinants in facility selection. A descriptive paper with many cost comparisons and in-depth alternative evaluation. Final selection of a centralized septic tank-soil absorption system with small diameter gravity and pressure sewer was made and the facility was installed at a significant savings of at least 13 percent over conventional sewerage. (SWF)

ACC# : L000735
AUTHOR: Barrows, R.; Bowes, M.
AFFIL : Dept. of Agricultural Economics, Univ. of Wisconsin-Madison, WI
TITLE : The Cost of Holding Tanks for Domestic Wastewater

SOURCE: Small Scale Waste Management Project, Univ. of Wisconsin-Madison, Madison, WI (12 pages)
YEAR : c. 1973
TEXT : Capital and maintenance costs (1973) of concrete and steel holding tanks are reviewed. Capital costs for uninstalled holding tanks ranged from $375 for a 1000 gallon steel tank to $2,500 for a 10,000 gallon concrete unit. Serving costs ranged from 0.8 to 12.0 cents per gallon. Approximate costs were based on the charges and experiences of holding tank pumpers. (SWF)

ACC# : L000736
AUTHOR: D'Itri, F.M.; Culp, G.
AFFIL : Michigan State University, East Lansing, MI
TITLE : Land Treatment of Municipal Wastewater Effluents: Cast Histories
SOURCE: Supt. of Documents, U.S. Govt. Printing Office, Washington, DC, (79 pages)
YEAR : 1976
TEXT : This publication presents case histories of five properly managed systems of land application of municipal wastewater. The design criteri and operation of each facility are described, as well as the soil characteristics and the monitoring schedules used to assess the chemical and biological parameters. The five facilities considered are:

-The Michigan State University Water Quality Management Project,
-The City of Tallahassee Spray Irrigation Project,
-The Flushing Meadows Project,
-The Pennsylvania State University Wastewater Renovation and Conservation Project, and,
-The City of Boulder Colorado Project. (AU)

ACC# : L000737
AUTHOR: Filip, D.S.; George, D.B.; Kemp, M.S.
AFFIL : CH2M Hill Inc., Bellevue, Washington, D.C.
TITLE : Overland Flow and Slow Rate Systems to Upgrade Wastewater Lagoon Effluent
SOURCE: Progress in Water Technology, 11(4/5) (30 pages)
YEAR : 1979
TEXT : To evaluate the effectiveness of overland flow treatment in upgrading secondary wastewater lagoon effluent, three 15 x 36 m plots on a 2.5 percent slope were constructed and sown for a high density vegetative cover using Reed Canary grass. Wastewater was applied to the upper end of each plot at rates of 7.5, 15, and 22.5 cm/wk. Results from the overland flow system investigation were compared with similar data obtained the preceding year from an existing slow rate system on an adjacent site. Secondary effluent from the same lagoon system was applied to the slow rate system study area.

After evaluating influent and effluent water quality characteristic from both systems, site specific efficiences could be detailed for the land application systems tested. Overland flow may not be suitable as a future tertiary treatment process, because of the minimum BOD and SS effluent concentrations that seem to be attainable. Overland flow could be used as a nitrification-dentrification process if land costs were sufficiently low. The slow rate system can be an excellent tertiary treatment method if the groundwater is protected and no subsurface water collection and discharge is required because of low permeability soil conditions at this site. If a discharge is required organic carbon and nutrient concentrations might be unacceptable depending upon initial site soil conditions. (AU)

ACC# : L000738
AUTHOR: Golueke, C.G.
AFFIL : N/A
TITLE : Aquaculture in Resource Recovery
SOURCE: Compost Science/Land Utilization, 20(3) (8 pages)
YEAR : 1979
TEXT : This article describes aquaculture as a means of treating wastewaters and includes article reviews which discuss various aquatic plants, such as water hyacinth and duckweed, in upgrading wastewaters. Diagrams and photographs are included. (SWF)

ACC# : L000739
AUTHOR: Krishnan, S.B.
AFFIL : U.S. Environmental Protection Agency
TITLE : An Approach to Concept and Design of Wastewater Treatment Facilities for Rural and Semirural Communities and Fringe Areas of Cities
SOURCE: Individual Onsite Wastewater Systems - Proceedings of the Fifth National Conference, Ann Arbor Science Publishers, Inc., P.O. Box 1425, MI 48106 (5 pages)
YEAR : 1979
TEXT : Presents economic and reliable alternative wastewater treatment systems

for rural and semirural communities. Costs of conventional facilities for small communities, exceeding $10,000 per household in some cases, have made these facilities undesirable. Costs of alternative methods are included. (SWF)

ACC# : L000740
AUTHOR: Valdmaa, K.
AFFIL : Dept. of Soil Sciences, Section for Waste Biology, The Royal Agricultural College, Uppsala, Sweden
TITLE : The Mullbank Toilet
SOURCE: Compost Science, Nov-Dec, 1974:23-27 (5 pages)
YEAR : 1974
TEXT : The Mullbank toilet uses a 220 volt heating coil to facilitate decomposition of fecal material, food and scraps, toilet tissue, and newspaper. Performances of eight installations are compared. Only one was used daily over a long time period. A description of the toilet in included. (SWF)

ACC# : L000741
AUTHOR: Dewey, A.W.; Kolega, J.J.; Shu, C.S.
AFFIL : Dept. of Agricultural Engineering, University of Connecticut, New Haven, CT
TITLE : Streamline Septage Receiving Stations
SOURCE: Water and Wastes Engineering, July 1971:30-31 (2 pages)
YEAR : 1971
TEXT : Criteria for design of a septage receiving station, with the hauler and water pollution control in mind are presented. Schematic designs for a basic facility with two alternative adaptations are included. (SWF)

ACC# : L000742
AUTHOR: Farrel, R.P.
AFFIL : Environment/One Corp., Schenectady, N.Y.
TITLE : Low-Pressure Sewers Revisited
SOURCE: Journal of the New England Water Pollution Control Association, Sept. 1979 (7 pages)
YEAR : 1979
TEXT : The past history and future use of low pressure sewer systems are discussed. Topics include grant eligibility, design, installation, and maintenance experiences. A number of successful examples are cited. (SWF)

ACC# : L000743
AUTHOR: Otis, R.
AFFIL : University of Wisconsin-Madison, Madison, Wisconsin
TITLE : Building a Home in the Country? What You Should Know About Your Septic Tank System
SOURCE: Small Scale Waste Management Project, Cooperative Extension Programs, University of Wisconsin-Madison, Madison, Wisconsin (11 pages)
YEAR : 1976
TEXT : Septic tank systems and how to design, construct and maintain them are described. The procedure for obtaining septic tank and sanitary permits before building in Wisconsin is outlined. (SWF)

ACC# : L000744
AUTHOR: Popkin, B.P.
AFFIL : Water Resources Research Center, University of Arizona, Tucson, Arizona
TITLE : Increasing Water Supply for Home Irrigation
SOURCE: Water Reuse Symposium, Vol. 3 (9 pages)
YEAR : 1979
TEXT : Presents written summary of a poster presentation prepared for the American Water Works Associations Water Reuse Symposium. Deals with home irrigation in Arizona and ways to increase the water supply. Water sources discussed include greywater, harvested runoff and roof runoff. An analysis indicated that costs would be favorable for projects such as a 100 unit trailor park and a 50 unit apartment building. (SWF)

ACC# : L000745
AUTHOR: Bennett, E.R.; Linstedt, K.D.; Smith, D.G.
AFFIL : City of Boulder, Colorado
TITLE : Treatment of Secondary Effluent by Infiltration-Percolation
SOURCE: NTIS, Springfield, VA 22161 (114 pages)
YEAR : 1979
TEXT : The performance of an infiltrative-percolation system for improving the quality of secondary effluent from a municipal treatment plant was

evaluated. Three basins were constructed, and over a two-year period the influent and effluent from the underdrain were monitored. Analysis showed that COD, coliform, and ammonia nitrogen were removed effectively nitrate concentration increased due to nitrification of the ammonia nitrogen held in the soil matrix, and some phosphorus leakage was observed in the basins. In the percolate, significant increases in hardness, alkalinity, and chlorides were noted. Percolate was collected eight to ten feet beneath the three infiltrative-percolative basins. (SWF)

ACC# : L000746
AUTHOR: Gurak, R.; Kilama, W.; Winblad, U.
AFFIL : Tanzania National Scientific Research Council/Department of Paristology and Entomology, University of Dar es Salaam, Dar es Salaam, Tanzania
TITLE : Compost Latrines in Tanzania: A Preliminary Report
SOURCE: Compost Science, July/August:20-23 (4 pages)
YEAR : 1977
TEXT : A program was launched by the Tanzania National Scientific Research Council to research and develop latrines for villages and low-income, peri-urban, residential areas. Field tests carried out on four locations in Tanzania showed control of desease-causing parasites and bacteria. Diagrams of several latrine units are included. (SWF)

ACC# : L000747
AUTHOR: U.S. EPA
AFFIL : U.S. EPA, Office of Water Program Operations, Washington D.C. 20460
TITLE : Evaluation of Land Applications Systems: Evaluation Checklist and Supporting Commentary
SOURCE: NTIS, Springfield, VA 22161 (197 pages)
YEAR : 1976
TEXT : Procedures are set forth to assist EPA personnel in evaluating treatment systems that employ land application of municipal wastewater. In addition, information and assistance is provided which may be of value to other federal, state and local agencies, the wastewater industry, consultants and designers. However, it is not intended that the bulletin be used as a comprehensive design manual.

The bulletin consists of an evaluation checklist and parallel background information, and it is divided into three major parts dealing with: (1) facilities plans, (2) design plans and specifications, and (3) operation and maintenance manuals. (AU)

ACC# : L000748
AUTHOR: Jaynes, D.B., Tyler, E.J.
AFFIL : Dept. of Soil Sciences, University of Wisconsin, Madison, Wisconsin
TITLE : II. Comparison of One-Step Outflow Laboratory Method to an In-Situ Method for Measuring Hydraulic Conductivity
SOURCE: Dept. of Soil Sciences, University of Wisconsin, Madison, Wisconsin (113 pages)
YEAR : 1978
TEXT : In this second part of a University of Wisconsin master's thesis, the hydraulic conductivity, k, of five soil horizons; the C horizon of a Plainfield sand (Typic Udipsamment) and Ringwood silt loam (Typic Hapludoll) and the B2 horizons of a Batavia silt loam (Typic Argiudoll), Plano silt loam (Typic Argiudoll) and Ontonagon loam (Typic Eutroboralf) was measured using the variation of the one-step porous membrane outflow method described by Passioura (1976). The method was adapted for measuring k for small (7.65 x 7.65 cm) undisturbed soil cores at soil moisture potentials between 0 and -100 mbars. Comparison of these k values with values previously measured "in-situ" for the same horizons with the crust test showed close agreement for the non-swelling, structureless soils. For swelling, structured soils, the one-step method gave k values approximately one order of magnitude lower than the "in-situ" values. This discrepancy may be due to the nature of swelling soils and the fact that the one-step method measures k for a draining soil while the crust test measures k for a wetting soil.

In swelling soils, the one-step method may give a better measure of k for a continually moist soil, whereas the crust test would give better k values for infiltration into a dry soil. (AU)

ACC# : L000749
AUTHOR: Kormanik, R.A., Cravens, J.B.
AFFIL : Envirex, Inc.
TITLE : Cost-Effective Algae Removal Possible with Microscreening
SOURCE: Water and Sewage Works, 128(8):31-35 (5 pages)
YEAR : 1979
TEXT : Discusses use of microscreening algae from lagoon effluent. Microscreening with one micrometer polyester fabric was shown to be more effective than 23 and 25 micrometer stainless steel media. Tests at eight lagoon sites using the polyester fabric achieved a minimum of a

30/30 effluent or better. Microscreening with the one micrometer polyester fabric was shown to be an alternative to DAF and sand filtration. (SWF)

ACC# : L000750
AUTHOR: Nemerow, N.L., Bryson, J.C.
AFFIL : Dept. of Civil Engineering, Syracuse Univ., Syracuse, New York
TITLE : How Efficient are Oxidation Ponds?
SOURCE: Wastes Engineering, March 1963 (4 pages)
YEAR : 1963
TEXT : Two oxidation ponds connected in series and serving a population of 1,975 provided effective wastewater treatment in a cold climate. BOD and suspended solids removal approached 88 and 83 percent, respectively, in these New York State ponds. Coliform reduction was 99.7 percent. Loading to the two ponds averaged 25.4 pounds BOD per acre per day. (SWF)

ACC# : L000751
AUTHOR: Jenkins, T.F., Martel, C.J.
AFFIL : U.S. Army Cold Regions Research and Engineering Laboratory, Hanover, New Hampshire
TITLE : Pilot Scale Study of Overland Flow Land Treatment in Cold Climates
SOURCE: Progress in Water Technology, 11(4/5):207-214 (8 pages)
YEAR : 1979
TEXT : A study, conducted at the Cold Regions Research and Engineering Laboratory, was designed to investigate the treatment effectiveness of overland flow over a 12-month period of continuous use in a cold temperature climate. Primary and secondary wastewaters were applied to separate sections of an overland flow site. The dimensions of each section were 3 m in width by 30 m in length and the system was graded to a five percent slope. The site was planted with orchard grass and tall fescue. Applied wastewater as well as surface and subsurface flows were monitored for nitrates, ammonia, TKN, BOD, suspended solids, pH, conductivity, and total phosphorus.

The results indicate excellent warm weather performance for removal of oxygen-demanding substances, suspended matter and nitrogen. Treatment efficiency of suspended solids remained high throughout the winter while treatment of BOD declined to unacceptable levels at soil temperatures below 4 degrees C. Nitrogen treatment declined rapidly below 14 degrees C. The form of nitrogen applied to overland flow was found to affect performance with nitrate being the less desirable form. Phosphorus treatment by overland flow was found to be about 80 percent in the summer months, declining to nil during the winter. (AU)

ACC# : L000752
AUTHOR: Fletcher, P.W., Sharpe, W.E.
TITLE : Water Conservation Methods to Meet Pennsylvania's Water Needs
SOURCE: Journal American Water Works Association, 70(4):200-203 (5 pages)
YEAR : 1978
TEXT : Presents water conservation and wasteflow reduction methods available to Pennsylvania's sewered and unsewered communities. Includes a list of water-saving appliances, devices and techniques, plus steps in development of a water conservation and wasteflow reduction program. Lists recommendations of California Dept. of Water Resources. (SWF)

ACC# : L000753
AUTHOR: Rea, R.A., Upchurch, S.B.
AFFIL : Dept. of Geology, University of South Florida, Tampa, Florida
TITLE : Influence of Regolith Properties on Migration of Septic Tank Effluent
SOURCE: Groundwater, 13(2):118-125 (8 pages)
YEAR : 1980
TEXT : The waste migration patterns from a septic tank system were found to be influenced by receiving land properties, loading rates and local hydrology. The receiving land or regolith properties which affected contaminant movement were texture, adsorptive capacity and organic content. A study was conducted in Hillsborough County, Florida, utilizing an existing septic tank system. The soil at the test site consisted of fine to very fine grained quartz sand. Results showed minor variations in the regolith texture due to irregular distribution of silt, and clay sized sediment materials affected effluent movement patterns. These variations also affected phosphate, chloride and nitrate adsorption. (SWF)

ACC# : L000754
AUTHOR: Ackerman, R.A., Cosentino, I.A.
AFFIL : Technical Director ASTRE and President, Enviropak Division, Saxton Air Systems
TITLE : Recreational Area Water Reuse System
SOURCE: Water Reuse Symposium, Vol. 3 (6 pages)

YEAR : 1979
TEXT : Describes zero discharge sanitary system which can serve as a water recycling system, wastewater treatment facility or part of a land application system. System processes include equalization, gross particle removal, trickling filter, activated carbon adsorption, filtration, disinfection and storage. Operating systems show a 65 percent reduction in COD and BOD levels was achieved. System uses include recreational comfort stations and placement at construction sites, mining facilities and roadside rest areas. (SWF)

ACC# : L000755
AUTHOR: Edgar, J.G., Stewart, H.T.L.
AFFIL : Research Branch, Forests Commission, Victoria, Australia
TITLE : Wastewater Disposal and Reclamation Using Eucalyptus and Other Trees
SOURCE: Progress in Water Technology, 11(4/5):163-173 (11 pages)
YEAR : 1979
TEXT : Growing tree crops in conjunction with land disposal is a less common but attractive option because of the potential of such crops to utilize and reclaim large volumes of water. Such an option is doubly attractive in warm, naturally-dry climates, because of the very high growth rates which tree crops can achieve under irrigation. This paper discusses the tree cropping option in light of experience gained in a series of trials in the northern regions of the State of Victoria, Australia.

Results are reviewed of these trials, in which various native and introduced species have been tested under irrigation with river water, sewerage and winery effluent. Those species showing wide spectrum tolerance and adequate growth rates are discussed. Detailed research programs based on these species are outlined which seek to determine water usage, soil effects and effectiveness of renovation processes. Key factors in determining the overall cost effectiveness of plantation systems for land disposal and treatment are discussed. (AU)

ACC# : L000756
AUTHOR: Stephenson, K.Q
AFFIL : Pennsylvania State University, University Park, PA 16802
TITLE : Aerobic Treatment of Home Sewage
SOURCE: American Society of Agricultural Engineers, 1976 Annual Meeting, St. Joseph, Michigan 49085 (14 pages)
YEAR : 1976
TEXT : Batch and continuous flow aerobic treatment of sewage were conducted to determine the effects of temperature, filtration and waste strength on effluent quality. Increased temperatures were found to increase reductions of COD and TSS in batch treatment, but comparable temperature effects were not found in continuous flow treatment. (AU/SWF)

ACC# : L000757
AUTHOR: Quin, B.F.
AFFIL : Winchmore Irrigation Research System, Ministery of Agriculture and Fisheries, Ashburton, New Zealand
TITLE : Surface Irrigation with Sewage Effluent in New Zealand - A Case Study
SOURCE: Progress in Water Technology, 11(4/5):103-126 (24 pages)
YEAR : 1979
TEXT : Since 1958, oxidation pond effluent from a population of 2000 has been used to surface irrigate 25 hectares of grass/clover sheep pasture. Soil fertility has built up to the stage that no further nutrients can be adsorbed by the soil. Considerable nutrient loss in the drainage can now be observed in the shallow groundwater downstream from the irrigation site. Nitrate was measured in this groundwater at levels of 15-20 mg/1. The limit for potable water is 10 mg/1. Discussions include chemical composition of the effluent, pasture production, nutrient and heavy metal status of the pasture and soils, nutrient loss, and groundwater quality. (SWF)

ACC# : L000758
AUTHOR: Hines, M.
AFFIL : Illinois Dept. of Public Health, Springfield, Illinois
TITLE : Illinois Wastewater Disposal Zones
SOURCE: Individual Onsite Wastewater Systems - Proceedings of the Fifth National Conference, Ann Arbor Science Publications, P.O. Box 1425, Ann Arbor, MI (5 pages)
YEAR : 1979
TEXT : In 1977 the U.S. Congress amended the Federal Clean Water Act. The revised federal regulations stipulate that any public body eligible for construction grants may construct privately owned treatment works. The Act allows corporate authorities to establish by ordinance an on-site wastewater disposal zone as long as not more than 50 percent of the real property owners within the zone do not object. Once the zone has been established, authorized representatives of the municipality have the authority to enter any premises at all reasonable times for purposes of

inspection. The implications of this option for accelerated funding and construction of rural wastewater treatment facilities in Illinois is also discussed. (SWF)

ACC# : L000759
AUTHOR: McPherson, J.B.
AFFIL : Melbourne and Metropolitan Board of Works Farm, Weribee, Victoria, Australia
TITLE : Land Treatment of Wastewater at Weribee, Past, Present, and Future
SOURCE: Unknown
YEAR : 1979
TEXT : For over 80 years, wastewater treatment by land application has been successful at this Australian city. Depending on the season and the rate of flow, three methods of land application are employed: land filtration, overland flow, and lagooning. The effects of climate, geology, soils, nutrient removal, phosphorus removal, heavy metals, hydraulic loading and livestock growth are discussed. Plant performance is described and future proposals are outlined. (SWF)

ACC# : L000760
AUTHOR: Bouma, J., Anderson, J.L.
AFFIL : University of Wisconsin, Madison, Wisconsin
TITLE : Relationships Between Soil Structure Characteristics and Hydraulic Conductivity
SOURCE: University of Wisconsin, Extension, 29 pages
YEAR : 1973
TEXT : Reports on the feasibility of using the description and measurements of soil pores for prediction of hydraulic conductivity (K) in artificial soil mixtures and natural soil horizons. The authors review and refine methods for obtaining more accurate morphometric soil porosity data in the field and laboratory. (SWF)

ACC# : L000761
AUTHOR: Otis, R.J., Stewart, D.E.
AFFIL : University of Wisconsin, Madison, Wisconsin
TITLE : Alternative Wastewater Facilities for Small Unsewered Communities in Rural America
SOURCE: University of Wisconsin, Madison, Wisconsin (84 pages)
YEAR : 1976
TEXT : This is a report of studies by the Small Scale Waste Management Project into more cost-effective solutions to water pollution abatement in small communities. After comparing advantages and disadvantages of central vs. non-central wastewater systems, the authors list alternatives to non-central facilities and cite examples of appropriate management entities. Conclusions were applied to facility planning and design for a small Wisconsin community (Westboro, pop. 200). The system chosen was a small-diameter gravity collection from individual septic tanks, with effluent disposal in a single soil absorption field. Under a central management district, a 20 percent cost savings over a conventional system may be realized. An appendix discusses management alternatives appropriate for Michigan, Minnesota and Wisconsin. (SWF)

ACC# : L000762
AUTHOR: Sharpe, W.E.
AFFIL : Pennsylvania State University, University Park, Pennsylvania
TITLE : Water Conservation with Water-Saving Devices
SOURCE: Proceedings of a Conference - Water Conservation with Water-Saving Devices, Rutgers University, New Brunswick, New Jersey (9 pages)
YEAR : 1976
TEXT : This report lists all known water-saving devices and appliances and comments on their cost and availability. It briefly discusses alternatives for water conservation programs and some public policy implications of such programs at the local and national level. (SWF)

ACC# : L000763
AUTHOR: Chuang, F.S.
AFFIL : Environmental Division, C. E. Maguire, Inc., New Britian, Connecticut
TITLE : Treatment of Septic Tank Wastes by an Anaerobic-Aerobic Process
SOURCE: Journal of the New England Water Pollution Control Association, 10(1): (4 pages)
YEAR : 1976
TEXT : An anaerobic-aerobic wastewater treatment system is described. Solids degradation occurs in the anaerobic stage, followed by degradation of soluble organics in the aerobic stage. A sand filter provides final effluent polishing. Laboratory studies show BOD and COD reductions of over 95 percent; similar decreases were also recorded for phosphate, ammonia nitrogen and total Kjeldahl nitrogen. Volatile solids reduction was approximately 40 percent. Low costs, coupled with simple operation

and maintenance, make this a viable treatment alternative. (SWF)

ACC# : L000764
AUTHOR: Machmeier, R.E.
AFFIL : Dept. of Agricultural Engineering, Univ. of Minnesota, St. Paul, Minnesota 55108
TITLE : Design Criteria for Soil Treatment Systems
SOURCE: American Society of Agricultural Engineers, St. Joseph, Michigan 49085 (36 pages)
YEAR : 1975
TEXT : Disposal of sewage effluent in soils leads to biological clogging. The paper is a critical discussion of the design criteria of soil absorption systems, as controlled by the equilibrium flow rate of the clogging zone. Other factors controlling soil acceptance rate are porosity, effluent quality, hydraulic head, distribution and dosing. Sizing of the drainage field and loading rates are critical factors in proper construction techniques of soil disposal systems. (SWF)

ACC# : L000765
AUTHOR: Siegrist, R., Hutzler, N.
AFFIL : University of Wisconsin, Madison
TITLE : The Manipulation of Household Wastewater
SOURCE: Small Scale Waste Management Project, Univ. of Wisconsin, Madison (10 pages)
YEAR : 1975
TEXT : This paper critically considers the consequences of using non-water carriage toilets listed in an earlier Canadian study. Although waste separation reduces the loading of the soil disposal system, this paper registers concern with the proper treatment of the segregated black and grey components. Available water-saving devices can reduce wastewater flow by up to 30 percent, but the uncontrollable human element makes flow reduction difficult to guarantee. (SWF)

ACC# : L000766
AUTHOR: N/A
AFFIL : University of Wisconsin - Madison and University of Wisconsin - Extension
TITLE : On-Site Wastewater Disposal for Homes in Unsewered Areas
SOURCE: University of Wisconsin, Madison (16 pages)
YEAR : 1973
TEXT : This report summarizes the septic tank disposal system and its potential operational problems due to soil conditions, age or obsolescence, and nitrate pollution of groundwater. It briefly discusses the on-going research of the Small Scale Waste Management Project into several on-site alternatives such as aerobic tanks, soil filters and mounds, as well as wasteload reduction. (SWF)

ACC# : L000767
AUTHOR: Ziebell, W.A., Otis, R.J., Bouma, J.
AFFIL : University of Wisconsin, Madison
TITLE : A Report of an Investigation of an Experimental Household Wastewater Treatment and Disposal System at the Harris Residence, North Cape, Wisconsin - Part I: Evaluation of Treatment System
SOURCE: University of Wisconsin, Madison (26 pages)
YEAR : C. 1972
TEXT : This report by the Small Scale Waste Management Project describes an experimental household wastewater treatment and disposal system developed for the slowly permeable soil conditions found in Wisconsin. The system consisted of two aeration and one process tank connected in line with a chlorinator. Treated wastewater was discharged under pressure over a subsurface gravel bed. An underdrain collected the water and transported it to a final soil absorption trench. Final effluent was discharged into a nearby stream. The unit provided treatment comparable with the conventional septic tank system but was found to be more costly and more mechanically complex than other wastewater treatment units now available. (SWF)

ACC# : L000768
AUTHOR: N/A
AFFIL : U.S. Environmental Protection Agency
TITLE : Onsite Wastewater Treatment and Disposal Systems: Design Manual
SOURCE: U.S. Environmental Protection Agency, Municipal Environmental Research Laboratory, Cincinnati, OH 45268 (392 pages)
YEAR : 1980
TEXT : This document provides information on generic types of on-site wastewater treatment and disposal systems. The design information presented is intended as technical guidance reflective of sound, professional practice. The intended audience for the manual includes those involved

in the design, construction, operation, maintenance, and regulation of on-site systems. Major topics considered include site evaluation procedures, wastewater characteristics and modification, on-site treatment and disposal methods, residuals disposal and management of on-site systems. (AU/SWF)

ACC# : L000769
AUTHOR: Hussainy, S.U.
AFFIL : Melbourne and Metropolitan Board of Works Farm, Werribee, Victoria, Australia
TITLE : Ecological Studies of Lagoons at Werribee: Removal of Biochemical Oxygen Demand, Nitrogen and Heavy Metals
SOURCE: Progress in Water Technology, 11(4/5):315-337 (23 pages)
YEAR : 1979
TEXT : Four lagoon series at the Board of Works Farm Werribee treating raw sewage were studied and compared between 1971-1978. Operating and water quality parameters recorded included -- temperature, pH, suspended solids, BOD, dissolved oxygen, nitrogen, heavy metals, chlorophyll, and phyto- and zooplankton species and numbers.

Results indicate average BOD removals of 75 percent and 47-85 percent removal of heavy metals. Suspended solids in the effluent of two of the ponds ranged from 32 to 50 mg/1. Higher organic loading is possible only with good sludge contact. Bacterial and plankton studies were also included. (AU/SWF)

ACC# : L000770
AUTHOR: Farrell, R.P.
AFFIL : Environment/One Corp., Schenectady, New York 12309
TITLE : Pressure Sewers and the Grinder Pump Which Makes Them Possible
SOURCE: Journal of the New England Water Pollution Control Association, Nov. 1972:200-212 (14 pages)
YEAR : 1972
TEXT : A review of pressure sewer technology is presented, including basic pressure sewer design criteria and grinder pump characteristics. (SWF)

ACC# : L000771
AUTHOR: Farrell, R.P.
AFFIL : Environment/One Corp., Schenectady, New York 12309
TITLE : How Knowledge of Low Pressure Sewer Research Was Transferred - A Case Study
SOURCE: Water Knowledge Transfer, Vol. 1, Water Resources Publications, Fort Collins, Colorado:345-351 (7 pages)
YEAR : 1978
TEXT : By generating, reporting and transferring information, the methodology of using low pressure sewers for centralized wastewater collection was presented to engineers and practitioners. The history of research, development, marketing, and dissemination of information dealing with grinder pumps is reviewed. The limited availability and expense of papers from NTIS is noted. (SWF)

ACC# : L000772
AUTHOR: Farrell, R.P.
AFFIL : Environment/One Corp., Schenectady, NY 12309
TITLE : Grinder Pumps for Individual Applications and Systems Use
SOURCE: 73rd Annual Meeting of the American Society of Sanitary Engineering; San Diego, California, Oct. 21-22, 1979 (9 pages)
YEAR : 1979
TEXT : Grinder pump construction and applications are described in this article. A typical grinder pump assembly is schematically represented. Performance characteristics and typical energy requirements are noted. (SWF)

ACC# : L000773
AUTHOR: Hypes, W.D.
AFFIL : National Aeronautics and Space Administration
TITLE : Laboratory and Family Live-In Experiences with Domestic Greywater Reuse Systems
SOURCE: Individual OnSite Wastewater Systems - Proceedings of the Fifth National Conference, Ann Arobr Science Publishers, Inc., Ann Arbor, MI 48106 (20 pages)
YEAR : 1979
TEXT : Reuse of domestic bath and laundry wastewater for toilet flushing was investigated from August 1977 to August 1978 with four persons simulating typical family conditions. Chemical, physical, and microbiological characteristics of the greywater from the bath and laundry were determined. Pretreatment to reduce particulates, odors, and coliforms was required in order to reuse greywater. Pretreatment included filtering by diatomaceous earth and the addition of 20 ppm of chlorine to attain

satisfactory greywater quality. Actual water use reduction was 27 percent with a potential to save as much as 33 percent. A maintenance and repair history was included which indicated that this reuse system would require monthly maintenance. (SWF)

ACC# : L000774
AUTHOR: Leinicke, J.R.
AFFIL : Supervisor, Facilities Planning Unit, Division of Water Pollution Control, Illinois Environmental Protection Agency, Springfield, Illinois
TITLE : Small Community Facilities Plans and Onsite Disposal - A State Experience
SOURCE: Individual On-site Wastewater Systems - Proceedings of the Fifth National Conference, Ann Arbor Science Publishers, Inc., Ann Arbor, MI 48106 (6 pages)
YEAR : 1978
TEXT : Illinois' experience in bringing on-site wastewater disposal into the facilities planning process of the Public Law 92-500 construction grants program is described. Guidelines for facility planning, legislation dealing with on-site disposal systems management, and the state's grants program for individual systems are also discussed.

ACC# : L000775
AUTHOR: Miller, D.R.
AFFIL : Science Applications, Inc., Water Resource Division, Tustin, California
TITLE : Solutions to Problems Using On-Site Wastewater Management at Apple Valley and Three Rivers California
SOURCE: Individual Onsite Wastewater Systems - Proceedings of the Fifth National Conference, Ann Arbor Science Publishers, Inc., Ann Arbor, MI 48106 (11 pages)
YEAR : 1978
TEXT : Two small California communities with hot, arid climates compared waste treatment systems ranging from high-cost central sewage collection systems to on-site treatment facilities. Conclusions stated that rural communities must look to a central maintenance management concept of septic systems because the homeowner will not take care of his individual system. Because of cost, both communities are looking toward on-site wastewater treatment facilities. Three Rivers has formulated an on-site wastewater management district and adopted a combination of mound systems between lots and recirculating sand filters. (SWF)

ACC# : L000776
AUTHOR: N/A
AFFIL : SCS Engineers, Long Beach, CA
TITLE : Sewer Moratoria: Causes, Effects, Alternatives
SOURCE: Office of Policy Development and Research, The Dept. of Housing and Urban Development, Washington, D.C. 20410 (168 pages)
YEAR : 1977
TEXT : Four major topics are presented in this guidebook: The sewer moratorium issue, reducing the impact of a moratorium, advance planning for wastewater management, and treatment processes and small treatment plants. Approaches to dealing with problems caused by moratoria and the use of small or interim wastewater treatment facilities including cost and performance data are discussed in layman terms. (SWF)

ACC# : L000777
AUTHOR: Witz, R.L., Pratt, G.L., Vogel, S., Moilanen, C.
AFFIL : North Dakota State University Cooperative Extension Service
TITLE : Waste Disposal Systems for Rural Homes
SOURCE: Circular No. AE-43, Cooperative Extension Service, North Dakota State University, Fargo, North Dakota 58102 (15 pages)
YEAR : 1974
TEXT : Describes the installation and operation of the septic tank, with the absorption-type disposal field on level and sloping land, the seepage pit, the Nodak disposal system and the disposal lagoon. Provides brief descriptions of aerobic digestion systems, electric or gas treated toilets and portable toilets. Lists regulations of the North Dakota State Health Department pertaining to sewage and waste disposal for resort homes, cabins, business enterprises, campgrounds, etc., in shoreline areas adjacent to recreational reservoirs and lakes. (SWF)

ACC# : L000778
AUTHOR: Glasser, M.B.
AFFIL : Project Manager for Garrett County Home Aeration Wastewater Treatment Project, Garrett County, Maryland
TITLE : Garrett County Maryland Home Aeration Waste Treatment Project, Garrett County, Maryland, 1973-1974
SOURCE: Environmental Health Administration Bureau of Sanitary Engineering, Maryland State Department of Health and Mental Hygiene (62 pages)

YEAR : 1976
TEXT : The primary purpose of this project was to evaluate and test aerobic treatment systems under field conditions using individual homes as test sites. Although most of these units passed the National Sanitation Foundation tests under Standard 40, there was a question as to whether or not this previous testing assessed the units' ability to respond to variable surges or shock loadings and also, how they would respond to the natural environment over a long period of time. The project also evaluated the ability of units to overcome stress factors such as household water conditioners; extreme use of laundry detergents with resulting foaming problems from repeated laundry cycles; introduction of fresh, uncomminuted toilet wastes; and undiluted chemicals.

Five different units were tested. Average BOD and suspended solids concentrations in the effluent ranged from 27 to 70 mg/1 and 56 to 104 mg/1, respectively. Absorption fields previously clogged when served by septic tanks did provide satisfactory service. The need for regular maintenance was noted. (AU/SWF)

ACC# : L000779
AUTHOR: N/A
AFFIL : Energy, Water and Telecommunications Department, The World Bank
TITLE : Socio-Cultural Aspects of Water Supply and Excreta Disposal
SOURCE: The World Bank-Energy, Water and Telecommunications Department, P.U. Report No. RES 15 (75 pages)
YEAR : 1978
TEXT : Social and cultural factors influencing people's responses to water supply and excreta disposal technologies are investigated in eight case studies of communities in the rural and urban fringe areas of Latin America. Part 1 describes the methodology and questionnaire used to investigate how sanitation and water supply problems are perceived and to what extent people would be willing to participate in projects to improve their existing situation. Part 2 summarizes each case study, including the technologies introduced and community response to them. Part 3 presents the cross-community findings on perceptions, preferences, related practices, and the use of social science techniques to understand them. In Part 4, the report focuses on the implications of the findings and suggests an approach which can be used by planners to integrate social and cultural factors into project design to ensure the introduction of water supply and excreta disposal technologies which will be accepted, properly used, and maintained. (AU)

ACC# : L000780
AUTHOR: Stewart, L.W., Carlile, B.L., Cassel, D.K.
AFFIL : Dept. of Soil Science, North Carolina State University
TITLE : An Evaluation of Alternative Simulated Treatments of Septic Tank Effluent
SOURCE: Journal of Environmental Quality, 8(3):397-403 (6 pages)
YEAR : 1979
TEXT : Six modified soil columns (180 by 15 cm) with an upper unsaturated zone and a lower saturated zone were dosed twice daily for 220 days with 1.65 cm of septic tank effluent via a cinderblock cube. Examined were: (i) the performance of the cinderblock material as a means of introducing effluent into two soils having different textures, (ii) the treatment capability of the two soils under unsaturated flow to purify septic tank effluent, and (iii) denitrification in a saturated zone containing either a Histic epipedon-sand mixture or gravel only. Severe biological clogging occurred after 50 days in the cinderblock material embedded in the loamy sand columns. This resulted in continuously ponded effluent inside the cinderblock cubes. Continuous ponding did not develop in the cubes placed in the sand columns.

At a distance 95 cm below the cinderblock cube, conversion of total nitrogen to nitrate in sand columns ranged from 83 to 100 percent. Column effluent samples analyzed for fecal coliform were all negative. Soil samples revealed no penetration of fecal coliforms below 30 cm in either the loamy sand or sand columns. Chemical oxygen demand in the column effluent gradually declined from 188 mg/liter at 42 days to 85 mg/liter at 220 days. No significant denitrification occurred in the saturated zones containing gravel only. (AU)

ACC# : L000781
AUTHOR: Hansen, J.A., Therkelsen, H.H., Buch-Hansen, P.
AFFIL : Department of Sanitary Engineering, Technical University of Denmark, 2800, Lyngby, Denmark
TITLE : Appraisal of Four Alternative Excreta Removal Systems for Urban Areas in Developing Countries
SOURCE: Progress in Water Technology, 11(1):235-249 (15 pages)
YEAR : 1978
TEXT : Four low cost sanitation systems (sewerage, sewered aqua privies, vaults and community blocks) are discussed for implementation in an urban tropical setting. Emphasis is placed on a technical, financial and economic

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        evaluation and comparison of these four schemes.  The approach outlined
        in this paper provides an improved basis for the decision-maker regard-
        ing choice between systems and types of technology and regarding the
        factual cost to society of the project, i.e., in relation to an alterna-
        tive project altogether. (AU)

ACC#  : L000782
AUTHOR: Bouma, J., Van Rooyen, D.J., Hole, F.D.
AFFIL : Soil Science Department, University of Wisconsin, Madison
TITLE : Estimation of Comparative Water Transmission in Two Pairs of Adjacent
        Virgin and Cultivated Pedons in Wisconsin
SOURCE: Geoderma, 13:73-88 (16 pages)
YEAR  : 1975
TEXT  : Hydraulic properties and soil morphology of soil horizons of paired
        virgin and cultivated pedons, each pair with identical soil classifica-
        tions, were studied at two sites.  The capacity of the two cultivated
        soils to transmit water under saturated conditions was reduced as com-
        pared with the virgin soil, whereas this capacity generally increased in
        unsaturated soil at corresponding moisture tensions.  Presents examples
        relating to soil suitability for on-site liquid waste disposal.  (SWF)

ACC#  : L000783
AUTHOR: Wright, A.M.
AFFIL : Civil Engineering Dept., University of Science and Technology, Kumasi,
        Ghana
TITLE : A Review of Rural Excreta Disposal Systems
SOURCE: Progress in Water Technology 11(1):211-218 (8 pages)
YEAR  : 1979
TEXT  : At an international meeting held in Ghana in 1977, 25 excreta disposal
        systems were reviewed and ranked for possible use in rural areas in de-
        veloping countries.  The three top ranked systems were the Research-cum-
        Action latrine (RcA), the dug well latrine, and the Reids Odorless Earth
        Closet (ROEC).  The ROEC has since been modified into what has been
        called the V.I.P. latrine.  The criteria used for ranking were cost,
        health aspects, safety, aesthetics, ecological aspects, and appropriate
        technological attributes such as energy requirements, ease of operation,
        permanency and availability of materials.  (AU/SWF)

ACC#  : L000784
AUTHOR: Popkin, B.P.
AFFIL : Water Resources Research Center, University of Arizona, Tucson
TITLE : Recycle Greywater for Home Irrigation
SOURCE: Water and Wastes Engineering, 15(9):62-64 (3 pages)
YEAR  : September 1979
TEXT  : Discusses the reuse of greywater for home irrigation in the arid South-
        west.  Greywater is the cheapest and most abundant supplemental water
        source.  Home watering of lawns and gardens accounts for 65 percent of
        domestic water use in the Southwest.  About 60 percent of the domestic
        wastewater load is greywater.  Reduction in potable water use through
        reuse of greywater leads to lower costs for domestic water usage and
        municipal services.  Includes tables of greywater characteristics and
        treatment options, and on the engineering and economics of greywater
        use.  (SWF)

ACC#  : L000785
AUTHOR: Wheeler, G., Bennett, J.
AFFIL : Water Resource Control Engineers, State Water Resources Board,
        Department of Water Quality, Sacramento, California  95801
TITLE : The Campaign in California for Alternative Systems
SOURCE: Individual Onsite Wastewater Systems - Proceedings of the Fifth National
        Conference, Ann Arbor Science Publishers, Inc., P.O. Box 1925, Ann
        Arbor, MI 48106 (11 pages)
YEAR  : 1979
TEXT  : Discusses the 1978 Alternative Systems Action Plan adopted by Califor-
        nia's Water Resources Control Board as a comprehensive state strategy
        towards better knowledge and more widespread acceptance of alternative
        wastewater systems.  After describing the various factors that influ-
        enced this program's adoption, there is a brief discussion of four dem-
        onstration projects sponsored by the state.  (SWF)

ACC#  : L000786
AUTHOR: McGarry, M.G.
AFFIL : International Development Research Centre, Ottawa, Canada
TITLE : The Importance of Waste Re-Use
SOURCE: Progress in Water Technology, 11(2):325-334 (10 pages)
YEAR  : 1979
TEXT  : Topics covered include nightsoil application, biogas generation, com-
        posting, compost toilets, fish farming, and direct algae harvesting.  A
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number of examples are briefly discussed. Problems of technology transfer are also presented. (SWF)

ACC# : L000787
AUTHOR: Waldorf, L. E.
AFFIL : Program Coordinator, Appalachian Regional Commission, Washington, DC
TITLE : So You Want a Federal Grant
SOURCE: Individual Onsite Wastewater Systems-Proceedings of the Fifth National Conference, 1978, Ann Arbor Science Publishers Inc., P.O. Box 1425, Ann Arbor, Michigan, 263-269 (4 pages)
YEAR : 1979
TEXT : The federal grant process is complicated, frustrating and can easily confuse those not usually involved with it. To help grant applicants, a few tips to aid in effective processing are presented. Honesty, patience and persistence are emphasized. (SWF)

ACC# : L000788
AUTHOR: Barnes, D., Wilson, F.

AFFIL : Univ. of New South Wales, Australia, Univ. of Canterbury, Christchurch, New Zealand
TITLE : The Design and Operation of Small Sewage Works
SOURCE: A Halsted Press Book, John Wiley & Sons, N.Y. (196 pages)
YEAR : 1976
TEXT : This comprehensive text provides practical assistance in the selection, construction and operation of small waste treatment plants. The book is aimed at an English-Canadian-Australian audience. Topics covered are: sewage and sewage disposal, characterization and measurement of sewage, effluent and sludges, effluent discharge-legislation and standards, difficulties of treatment at small and variable communities, chemical sanitation and physical-chemical treatment, cesspools and septic tanks, settlement processes, aerobic treatment processes, rotating biological filter, sludge production and disposal, tertiary treatment, structural design and construction, pumps and pumping, operation and maintenance of small sewage works, comparison of treatment processes and design, and sewage treatment in hot climates. Extensive use is made of examples. (SWF)

ACC# : L000789
AUTHOR: Brandes-M
AFFIL : Applied Sciences Section, Pollution Control Branch, Ministry of the Environment, 135 St. Clair Ave. W., Toronto, Ontario, Canada
TITLE : Phosphorus Removal From Human Wastewater by Direct Dosing of Alum to a Septic Tank
SOURCE: Applied Sciences Section, Pollution Control Branch, Ministry of the Environment, 135 St. Clair Ave. W., Toronto, Ontario, Canada (48 pages)
YEAR : 1976
TEXT : Results of a study to provide retention of phosphorus from domestic sewage in a septic tank are presented. Alum was injected into the tank at each flush of the toilet to allow mixing. Phosphorus removal was found to be a function of the alum/phosphorus ratio. An increase in effluent sulfates, a decrease in fecal coliform and additional sludge accumulation were noted. An alum dosing of 430 mg/1 removed 96 percent of the total phosphorus. The process was recommended for areas with a high water table located close to a body of water such as a lake, where a potential for artificial eutrophication exists. (SWF)

ACC# : L000790
AUTHOR: Mara, D., Silva, S.A.
AFFIL : Sanitarios-EXTRABES, Universidade Federal de Paraiba, Caixa Postal 306, Campina Grande, Paraiba, Brazil
TITLE : Sewage Treatment in Waste Stabilization Ponds: Recent Research in Northeast Brazil
SOURCE: Progress in Water Technology, 11(2):341-344 (4 pages)
YEAR : 1979
TEXT : Discusses the results obtained during the first year's operation of the experimental pilot scale waste stabilization ponds at the Federal University of Paraiba's sewage treatment research station. Presents the mean results obtained for BOD, COD, suspended solids, fecal coliforms and fecal streptococci removal from facultative maturation and anaerobic ponds. A higher BOD loading than commonly used for design was found acceptable for facultative ponds. Maturation ponds connected in series were found to achieve a very high removal of BOD and fecal bacteria. Little advantage resulted from subdividing anaerobic ponds. (SWF)

ACC# : L000791

AUTHOR: Johnson, J.J., Geisel, F.J.
AFFIL : Green International Affiliates, Inc., Boston, Massachusetts
TITLE : Clay Caps Lagoon System
SOURCE: Water and Sewage Works, 126(11):30-31 (2 pages)
YEAR : 1979
TEXT : Discusses the construction of a facultative lagoon system which utilizes a processed clay (bentonite) sealant for the lagoon bottoms and dikes. Bentonite is a natural material that, when hydrated, swells up to 15 times its initial volume. When mixed into surface soil and wetted, the substance becomes a gel-like blanket that can provide an almost impermeable barrier against liquid seepage. Comparison is made with a membrane liner. (SWF)

ACC# : L000792
AUTHOR: Nielson, N.E.
AFFIL : Aqueonics, Inc., Santa Clara, CA
TITLE : Ozonation, Irradiation, Chlorination and Combinations: A Discussion of Their Use in Smaller Water/Wastewater Treatment Systems
SOURCE: Individual On-Site Wastewater Systems - Proceedings of the Fourth National Conference, Ann Arbor Science Publishers Inc., P.O. Box 1425, Ann Arbor, MI 48106 (14 pages)
YEAR : 1977
TEXT : Common forms of chemical disinfection, chlorination and ozonation are briefly discussed in this article. The least known forms of irradiation technology are described in theory, and examples of their use for disinfection are discussed. The field installation of an ozone-cobalt 60 gamma irradiation unit was described, but treatment results were not presented. A lengthy reference list concludes the article. (SWF)

ACC# : L000793
AUTHOR: Tawa, A.J., Feng, T.H.
AFFIL : Dept. of Civil Engineering, Univ. of Massachusetts, Amherst, MA 01003
TITLE : Chemical Treatment of Septage
SOURCE: Division of Water Pollution Control, Massachusetts Water Resource Commission (92 pages)
YEAR : 1978
TEXT : Various types of chemical coagulation of septage were investigated in bench scale and in batch experiments. Alum, ferric chloride and numerous polymers were tested, yet some septages (10 percent) were found to be untreatable. Alum and ferric chloride proved valuable for chemical treatment. Most polymers tested had limited value. Chemical coagulation produced a sludge that was amenable to vacuum filtration or bed drying prior to final disposal. The supernatant contained high concentrations of BOD-5, COD and total solids. (SWF)

ACC# : L000794
AUTHOR: Wagner, P.L.
AFFIL : Mayes, Sudderth & Etheridge, Inc., Atlanta, GA
TITLE : A County Plan for Innovative Wastewater Management
SOURCE: Public Works, 110(9):104-105 (2 pages)
YEAR : 1979
TEXT : In an effort to seek cost-effective alternatives for wastewater treatment in Evans County, Georgia, consultants propose that the .5 MGD of Claxton be passed through a conventional gravity sewer to a 15-acre stabilization basin and then to spray irrigation of a 60-acre site with forage grasses. For the smaller city of Hagan, the four options proposed use of existing septic tanks, collection by gravity and/or pressure sewers, and disposal in clustered soil absorption fields. Includes cost comparisons. (SWF)

ACC# : L000795
AUTHOR: Blackmore, M.D.
AFFIL : Ministry of Local Government and Lands, Gaborone, Botswana
TITLE : Alternative Sanitation in Botswana
SOURCE: Progress in Water Technology, 11(1/2):219-224 (6 pages)
YEAR : 1978
TEXT : Describes in non-technical style the two-year Low Cost Sanitation Project begun in 1976 by the Botswana government and IDRC Canada. The team studied latrine systems in other African countries and India but concentrated its evaluation on three systems appropriate to Botswana, i.e., the "Botswana Type B" aqua privy; straight and offset pit latrines; and composting or mouldering latrines, including the double vault. Testing involved construction of 90 units in four towns and provided the basis for final team recommendations. (SWF)

ACC# : L000796
AUTHOR: N/A
AFFIL : From information provided by AWT Systems, Inc., 910 Market St.,

Wilmington, Delaware and Levitt and Sons, Inc., Lake Success, New York
TITLE : Miniature Treatment Plant Operates in Housing Community
SOURCE: Water and Sewage Works, 120(5):102-104 (3 pages)
YEAR : 1973
TEXT : Briefly describes a physical-chemical treatment system for a planned 580-person New Jersey community. It is located in a home-like structure on a one-acre lot with landscaping and playgrounds for the subdivision. The system feeds sewage from a wet well to a surge tank after solids are screened off to an incineration unit. Ferric chloride and sodium hydroxide precede entry to a clarifier, followed by a mixer in which iron oxide traps suspended solids. Carbon adsorption and chlorination complete the cycle. Incineration is by waste combustion heat and fuel oil and involves a fluidized sand bed. The same unit serves to regenerate the carbon. (SWF)

ACC# : L000797
AUTHOR: Zilber,J., Harkin, D., Quigley, J.T.
AFFIL : N/A
TITLE : Disposal of Liquid Wastes From Holding Tanks and Septic Tanks
SOURCE: N/A (20 pages)
TEXT : The economics of pumping and hauling holding tank contents and septic tank sludge in Wisconsin were determined by hauler survey. Influencing factors include distance of haul, frequency of service, truck size, and availability of disposal sites. Present Wisconsin regulations and proposed supplemental proceedures for disposal of holding tank and septage are included. Six counties were surveyed and a case history was prepared for one county. (SWF)

ACC# : L000798
AUTHOR: Shelef, G., Moraine, R., Messing, A., Kanarek, A.
AFFIL : Sherman Environmental Engineering Research Center, Technion, Haifa, Israel 32000
TITLE : Improving Stabilization Pond Efficiency and Performance
SOURCE: Progress in Water Technology, 11(4/5):389-404 (16 pages)
YEAR : 1979
TEXT : The performance, efficiency, and stability of stabilization ponds can be significantly improved by introducing some mechanical energy as well as physico-chemical clarification of pond effluent. Two systems, the recirculated pond and the high-rate or accelerated pond, were tested in Israel. Recirculating about two-thirds of the effluent of a three stabilization ponds sequence into the first makes the system acceptable for larger population centers and permits increasing the loading of the first pond from 150 to over 400 Kg BOD/ha-day, or to 180 Kg/ha-day, overall. Since most the sewage degradation takes place in the first pond, overall loading of the system can be increased by an additional 50 percent or more by introducing part of the sewage feed into the second pond in series. A more intensive system yet is the high-rate pond, which is only 0.5 m deep, making a greater part of the pond cross-section available for photosynthesis. The high-rate pond is provided with some mechanical agitation to improve mass-transfer, so that its overall loading can be safely increased to 400-800 kg BOD/ha-day. Energy input into both types of ponds is still substantially below that of conventional mechanical systems. (AU)

ACC# : L000799
AUTHOR: Tortell, P.
AFFIL : Commission for the Environment, P.O. Box 11244, Wellington, New Zealand
TITLE : The Utilization of Waste Nutrients for Aquaculture
SOURCE: Progress in Water Technology, 11(4/5):483-498 (16 pages)
YEAR : 1979
TEXT : The current literature on integrated wastewater-aquaculture systems is reviewed. The problems and constraints of these systems are grouped as environmental, biological, technical and social. The products of wastewater-aquaculture include unicellular algae, aquatic macrophytes, invertebrates and finfish in both marine and freshwater systems. These products may be consumed directly (e.g. carp), used as feed or feed additives for other farmed animals (e.g. algae and brine shrimp), processed for valuable extracts (e.g. agar from seaweeds) or put to other uses (e.g. bait). (AU)

ACC# : L000800
AUTHOR: Young, E.C
AFFIL : Economics, Statistics and Cooperative Service, U.S. Dept. of Agriculture
TITLE : Land Application of Wastewater: A Cost Analysis
SOURCE: U.S. Department of Agriculture, Technical Bulletin No. 1594 (30 pages)
YEAR : 1978
TEXT : Land treatment of wastewater is a cost effective method for advanced treatment of municipal sewage. Costs of land treatment of wastewater

are analyzed using a computer simulation model. Six alternative techniques for land application are examined. Variations in costs are studied, using cost estimates and cost elasticity estimates. Assuming that the soil requirements are met, infiltration basins are the least cost technique for land application. Center pivot irrigation is the least cost irrigation alternative examined. Analysis of treatment economies of size indicates that most of the advantages to increasing facility size have been realized after facility size reaches 10 million gallons per day. (AU)

ACC# : L000801
AUTHOR: Finney, B.A., Middlebrooks, E.J.
AFFIL : Humboldt State University, Arcata, California, and Utah State University, Logan
TITLE : Facultative Waste Stabilization Pond Design
SOURCE: Journal Water Pollution Control Federation, 52(1):134-147 (14 pages)
YEAR : 1980
TEXT : A one-year study sponsored by the U.S. EPA evaluated the performance of four facultative lagoon systems. Three of the systems contain three cells while the remaining system contains seven lagoons. All systems were generally capable of providing a monthly average effluent BOD concentration below the federal standard of 30 mg/l. The effluent suspended solids concentration followed a seasonal pattern of higher concentrations during summer months due to intense algal growth and during the spring and fall overturns. Three types of design methods were evaluated: state organic and hydraulic loading rates, empirical equations, and kinetic (rational equations). None were found to be adequate when applied to the four systems studied. The authors feel determination of physical climatic influences on hydraulic residence time is vital in developing good design equations. (SWF)

ACC# : L000802
AUTHOR: Settergren, C., Tennyson, L.
AFFIL : School of Forestry, University of Missouri, Columbia, MC 65211
TITLE : The Importance of Soil in Evaluating Potential Wastewater Disposal Sites in the Missouri Ozarks
SOURCE: Water Resources Bulletin, 15(5):1353-1363 (11 pages)
YEAR : 1979
TEXT : The inherent capacity of the surface soil to retain, or at least detain, the various nutrient ions passing through the profile in the percolating waters becomes the prime consideration in regions with shallow water tables or in Karst areas such as the Missouri Ozarks where the risk of groundwater supply contamination is high. A comprehensive study of the nutrient renovation potential of several soils was undertaken at a proposed effluent irrigation site along the Ozark National Scenic Riverways in south central Missouri. The surface soil hydrology was evaluated employing selected soil water parameters. Exchange equilibria studies determined the retention capacity for Ca and Mg while the concentrations of other selected ions were analyzed in the soil water to measure their retention time and net removal. The movement of a bromine tracer was monitored as an index of the renovation capacity of these soils for the more mobile anions such as nitrate. Neutron activation analysis proved to be a useful tool in the water quality analyses. All surface soil profiles demonstrated some degree of nutrient renovation for the various nutrients studied. (AU)

ACC# : L000803
AUTHOR: Morse, A., Bhatt, V., Rybczynski, W.
AFFIL : Minimum Cost Housing Group, School of Architecture, McGill University, 348 University St., Montreal, Quebec, H3A 2A7 Canada
TITLE : Water Conservation and the Mist Experience
SOURCE: Minimum Cost Housing Group, School of Architecture, McGill University, 348 University St., Montreal, Quebec, H3A 2A7 Canada (59 pages)
YEAR : 1978
TEXT : Sourcebook for atomizers, nozzles, mist showers and other flow reduction devices for in-home and on-the-job applications. History and application of washing with mists are covered in detail. Test results for various devices are discussed and many flow control products are catalogued. Included are manufacturer addresses, product prices and product descriptions. An abstracted bibliography of 30 home water-saving books, pamphlets, and reports conclude this publication. (SWF)

ACC# : L000804
AUTHOR: Kilama, W.L., Wiblad, U.
AFFIL : University of Dar es Salaam, Tanzania
TITLE : Compost Toilets in the Tropics: A Review and Appraisal
SOURCE: Progress in Water Technology, 11(2):335-340 (6 pages)
YEAR : 1979
TEXT : Three basic types of compost latrines (discontinuous, alternating and

continuous) are reviewed and their performance appraised on the basis of tests carried out in three villages and one peri-urban squatter area in Tanzania between 1975 and 1978. Compost latrines are sensitive to misuse: refuse must be added regularly, overuse must be avoided and very little water must be added. Intensive health education is an important component, especially during initial use. (AU)

ACC# : L000805
AUTHOR: Okubo, T., Matsumoto, J.
AFFIL : Tohoku Univ., Aoba, Sendai 980, Japan
TITLE : Effect of Infiltration Rate on Biological Clogging and Water Quality Changes During Artificial Recharge
SOURCE: Water Resources Research, 15(6):1536-1542 (7 pages)
YEAR : 1979
TEXT : The effect of infiltration rate on biological clogging and water quality changes is investigated experimentally using a sand column. The concentration of soluble COD in the effluent is stable during three months of infiltration, and the lower the initial infiltration rate is, the higher the average percentage of the reduction of soluble COD becomes. The soluble COD is primarily removed in the surface layer. The hydraulic conductivity in the bottom layer decreases at the highest infiltration rate. The variation of infiltration rate is divided into four stages. In addition, the biological-clogging model is proposed, and the mechanism of biological clogging is discussed. (AU)

ACC# : L000806
AUTHOR: Alvord, R.
AFFIL : Mayor of Marathon, New York
TITLE : Small Town Gets Big Help for New Sewerage System
SOURCE: Public Works, 110(9):107-108 (2 pages)
YEAR : 1979
TEXT : The article discusses how the town of Marathon, New York (population 1000), was able to find funding from five federal and state agencies to cover most of the $2.6 million cost for a 0.2 MGD conventional collection sewerage system, leaving homeowners an annual bill of $160. (SWF)

ACC# : L000807
AUTHOR: Hendricks, G.F.
AFFIL : Sieco, Inc., Consulting Engineers
TITLE : Pressure Sewage System and Treatment - Grandview Lake, Indiana, Demonstration Project
SOURCE: American Society of Agricultural Engineers, Paper No. 71-412 (11 pages)
YEAR : 1971
TEXT : Grandview Lake is a 400 acre lake surrounded by residences using septic tanks. In order to avoid pollution of the lake, it was decided to collect the wastewater and discharge it to a central treatment plant. However, due to the rugged topography, conventional gravity sewers and lift stations were estimated to cost $10,000 per existing home. The need for an unconventional approach resulted in a federally supported demonstration project. The solution involved installation of home grinder pumps and a pressure sewer system discharging to a combined anaerobic-aerobic lagoon. It was found that the lagoon system would treat the septic tank effluent without odors. (SWF)

ACC# : L000808
AUTHOR: Viraraghavan, T., Warnock, R.G.
AFFIL : Dept. of Civil Engineering, University of Ottawa, Ottawa, Canada
TITLE : Treatment Efficiency of a Septic Tile System
SOURCE: Proceedings of the National Home Sewage Symposium, ASAE Publication, Proc-175 (10 pages)
YEAR : 1974
TEXT : A field investigation in Canada determined the efficiency of a septic tile system. The treatment efficiency with regard to BOD, ammonia, and phosphorus was reported. The samples were collected at the point where the septic tank effluent was distributed to the tile and then at various depths in the soil. The results show the soil reduced BOD levels by 70-90 percent. The efficiency of the septic tile was influenced by seasonal variations with 80-90 percent efficiencies for various parameters during summer and early fall. Phosphorus removals ran from 25-50 percent. Ammonia reductions ran from highs of 80-90 percent in the summer and fall to lows of 20-35 percent in the winter. (SWF)

ACC# : L000809
AFFIL : University of Wisconsin, Madison
TITLE : Application of Soil Surveys to Selection of Sites for On-Site Disposal of Liquid Household Wastes
SOURCE: Geoderma, 10:113-122 (10 pages)
YEAR : 1973

TEXT : A discussion of how soil survey maps may be used for delineate areas for various on-site wastewater systems. This information may be useful when applied through a cooperative effort by various government reviewing and planning agencies. An integrative effort by agencies educated in soil survey analysis and on-site wastewater disposal may make a significant impact in the use of innovative systems. (SWF)

ACC# : L000810
AUTHOR: N/A
AFFIL : Maine Dept. of Environmental Protection
TITLE : Cleaning Up the Water -- Private Sewage Disposal in Maine
SOURCE: State of Maine, Dept. of Environmental Protection, State House, Augusta Maine 04330 (33 pages)
YEAR : 1978
TEXT : This popular-style booklet is written for the half of Maine's population which depends on on-site treatment and is faced with the 1976 law prohibiting disposal of untreated wastewater into Maine waters. By using simple diagrams and tables, the booklet explains all approved disoosal sytems, including low-water and waterless toilets, wastewater separation and overboard disposal. A manufacturer's listing and other helpful hints to private homeowners are included. (SWF)

ACC# : L000811
AUTHOR: Baker, F.G.
AFFIL : University of Wisconsin, Madison
TITLE : Factors Influencing the Crust Test for in-situ Measurement of Hydraulic Conductivity
SOURCE: Soil Science Society of America Journal, 41(6):1029-1032 (4 pages)
YEAR : 1977
TEXT : Field trials using the crust test were used to determine the influence of five parameters on the saturated and unsaturated hydraulic conductivity values measured on two soils of different structure. These factors were (i) the diameter, (ii) the height of the soil pedestal used in the test, (iii) the degree of soil wetness at which k was measured, (iv) soil structure, and (v) operator effects. Diameter and height were found to strongly affect measurement when they had low values. These two design factors were dependent on the wetness and structure of the soil. Operator differences were small. (AU)

ACC# : L000812
AUTHOR: Cole, C.A.
AFFIL : Pennsylvania State Univ., Capital Campus W261, Middletown, PA 17057
TITLE : The Impact of Home Water-Saving Toilets on Wastewater Collection and Treatment
SOURCE: Publications Distribution Center, Cook College, Rutgers Univ., New Brunswick, NJ 08903, (6 pages)
YEAR : 1976
TEXT : The author calculates the effect of five different toilet discharge rates (5.25 gal./flush to 0.25 gal./flush) and the solids-carrying ability as measured by the flow velocity and depth. Plumbing code standards can still be met at two gallon flush amounts but may require smaller pipe diameters. Flow reduction lowers treatment plant loading rates, hence their hydraulic life, but its benefits may be cancelled by infiltration. (SWF)

ACC# : L000813
AUTHOR: Hegg, B.A., Rakness, K.L., Schultz, J.R.
AFFIL : M & I, Inc., Consulting Engineers, Colorado
TITLE : Evaluation of Operation and Maintenance Factors Limiting Municipal Wastewater Treatment Plant Performance
SOURCE: Municipal Environmental Research Laboratory, Office of R & D, U.S. EPA, Cincinnati, OH 25268, EPA-600/2-79-034 (157 pages)
YEAR : 1979
TEXT : Operation and maintenance problems at thirty wastewater treatment plants are discussed. Twelve of thirty plants have flows less than 0.25 MGD. The two highest ranking operation and maintenance factors limiting wastewater treatment plant performance were lack of sewage treatment understanding and inadequate operator application of concepts. Problems in plant designs are also involved in operators and maintenance problems. Operation and maintenance costs are also presented. (SWF)

ACC# : L000814
AUTHOR: Bouma, J., Anderson, J.L.
AFFIL : Soil Survey Institute, Wageningen, The Netherlands and Hennepin Soil and Water Conservation District, Wayzata, MN
TITLE : Water and Chloride Movement Through Soil Columns Simulating Pedal Soils
SOURCE: Soil Science Society of America Journal, 41(4) (5 pages)
YEAR : 1977

TEXT : An experiment was designed to study the hydrodynamics of soil columns of two contrasting textural mixtures: clay loam and sandy loam. A chloride tracer solution was applied to the surface in seven-minute periods to simulate the septic tank effluent distribution time of an average seepage bed. Varying numbers of 0.5 cm vertical pores drilled through the columns provided a means to study unsaturated flow and its control by soil texture and pore size, and it served as a check on observed characteristics of natural soils. Results show the significance of primary and secondary structure in the absorption or dilution of a tracer. The effect of a crust which establishes unsaturated flow is also defined. (SWP)

ACC# : L000815
AUTHOR: N/A
AFFIL : Municipal Finance Officers Association and Peat, Marwick, Mitchell & Co.
TITLE : Worksheets and Instructions for a Screening Procedure for Water Pollution Control Projects--Determination of Debt Capacity of Communities and Cities
SOURCE: Municipal Finance Officers Association and Peat, Marwick, Mitchell & Co., EPA Contract No. 68-01-4343 (14 pages)
YEAR : 1979
TEXT : This article provides communities and reviewing authorities with a procedure to determine if the community can afford a proposed water pollution control project while the project is in the developmental stage. Worksheets to calculate the financial impact of the project on the community are included. (SWP)

ACC# : L000816
AUTHOR: Goehring, D.R., Carr, F.R.
AFFIL : New Castle County, Newark, Delaware, Tatman & Lee Assoc., Inc., Wilmington, Delaware
TITLE : Septic System Problems on an Urban Fringe
SOURCE: Journal of the Water Resources Planning and Management Division, 106(WR1):88-102 (8 pages)
YEAR : 1980
TEXT : This article assesses the impact of septic systems on areas that border densely populated communities. Septic systems may result in groundwater pollution, scattered and low density land occupancy, and an increase in the cost of public services. A strategy for managing septic system growth on the urban fringe is presented that involves regulation, enforcement, maintenance and financing. (SWP)

ACC# : L000817
AUTHOR: N/A
AFFIL : U.S. EPA and National Water Well Association
TITLE : Proceedings of the Second National Water Quality Symposium
SOURCE: EPA Technology Transfer, Washington, D.C. 20460 (257 pages)
YEAR : 1974
TEXT : Technological advances and research discussions of groundwater quality are major topics of the 1974 proceedings. Three articles pertinent to small wastewater flows are presented (see L000113, L000174, L000277). Topics include septic tank system design, uniform distribution in soil adsorption fields and groundwater contamination. (SWP)

ACC# : L000818
AUTHOR: Lowry, W.M.
AFFIL : Williamstown, MD
TITLE : An Onsite System Solves a Problem at the Mill on the Floss Restaurant in New Ashford, Massachusetts
SOURCE: Individual Onsite Wastewater Systems - Proceedings of the Fifth National Conference, Ann Arbor Science Publishers, Inc., P.O. Box 1425, Ann Arbor, Michigan 48106 (5 pages)
YEAR : 1979
TEXT : Installation of an aerobic treatment unit and evapotranspiration beds at a restaurant site in a hilly Massachasetts town is described. This system replaced a septic tank - soil absorption system that was failing due to tight clay soils. Implementation included water reduction and careful design of the system. Results from a year's operation appear satisfactory as dissolved oxygen levels are high and no odors are present. (SWP)

ACC# : L000819
AUTHOR: Cooper, I.A., Rezek, J.W.
AFFIL : Emmons, Henry, Meisenheimer and Gende, Inc., Aurora, CO 80011
TITLE : Treatability of Pressure Sewage
SOURCE: Individual Onsite Wastewater Systems - Proceedings of the Fifth National Conference, Ann Arbor Science Publishers, Inc., P.O. Box 1425, Ann

Arbor, Michigan 48106 (32 pages)
YEAR : 1978
TEXT : Wastewater characteristics of various pressure sewer systems are presented. Treatment efficiencies attained for several EPA demonstration projects are tabulated. Advantages, disadvantages, system design, maintenance and operation for grinder pump and septic-tank effluent pumping systems are discussed. Results indicate that pressure sewage is readily treatable and that problems associated with treatment are minimal. Costs of treating pressure sewage versus gravity sewage are less than half due to the reduction of flow effected by a closed pumping system. A list of existing pressure sewer systems in the United States includes the type of system used, manufacturer and engineer of the system and other pertinent information. (SWF)

ACC# : L000820
AUTHOR: N/A
AFFIL : American Society of Agricultural Engineers
TITLE : Home Sewage Disposal - Proceedings of the National Home Sewage Disposal Symposium
SOURCE: ASCE, 2950 Niles Road, St. Joseph, MI 49085 (242 pages)
YEAR : 1975
TEXT : Presents the Proceedings of the National Home Sewage Disposal Symposium (American Society of Agricultural Engineers). Titles of topics covered are: "Home Sewage Disposal Review;" "Soil Disposal Systems;" "New Design Data and Practices, Characteristics and Loading;" "Alternatives to Traditional Soil Treatment and Disposal;" and "Economics, Design, and Evaluation Considerations." Focus of the symposium was on the subject of sewage disposal from a single family residence. (SWF)

ACC# : L000821
AUTHOR: Robertson, M.D., Barrows, R.L., McMillan, M.L., Shaffer, R.E.
AFFIL : Small Scale Wastewater Management Project, University of Wisconsin - Madison, Madison, WI
TITLE : Private Wastewater Treatment Regulations: Existing Conditions, Incentives, and Some Policy Suggestions
SOURCE: Small Scale Wastewater Management Project, University of Wisconsin - Madison, Madison, WI (43 pages)
TEXT : This discussion illustrates the problems of individuals when they respond to the private wastewater regulatory system. Current regulations governing construction, use, and maintenance of septic tank systems in Wisconsin are discussed in conjunction with the steps a hypothetical homebuilder takes to complete his system. The range of possible environmental difficulties, ranging from the illegal to standard administrative procedures, is introduced as well as possible responses by the homebuilder. Possible modifications to the regulatory system that focus on legal and safer environmental practices are encouraged. The costs involved with the enactment of these modifications are discussed. The major impact on cost would be the recommendation for inspection of systems under construction. (AU)

ACC# : L000822
AUTHOR: Middlebrooks, E.J., Falkenborg, D.H., Lewis, R.F. (editors)
AFFIL : EPA Municipal Environmental Research Laboratory
TITLE : Performance and Upgrading of Wastewater Stabilization Ponds - Proceedings of a Conference Held August 23-25, 1978, at Utah State University, Logan, Utah
SOURCE: NTIS, Springfield, VA 22161 (224 pages)
YEAR : 1979
TEXT : The proceedings contain 18 papers discussing and describing the design, operation, performance and upgrading of lagoon systems. Performance data for facultative and aerated lagoons collected at numerous sites throughout the USA are presented. Design criteria and the applicability of performance data to design equations are discussed. Rock filters, intermittent sand filters, microscreening and other physical-chemical techniques, phase isolation, land application, and controlled environment aquaculture were evaluated as methods applicable to upgrading lagoon effluents. The proceedings conclude with a presentation on the costs associated with the construction, operation and maintenance of lagoon systems. (AU)

ACC# : L000823
AUTHOR: Reynolds, J.H., Swiss, R.W., Macko, C.A., Middlebrooks, E.J.
AFFIL : Division of Environmental Engineering, Utah State University, Logan, Utah
TITLE : Facultative Lagoon Performance
SOURCE: Progress in Water Technology, 11(4/5):361-376 (16 pages)
YEAR : 1979
TEXT : The general objective of this study was to determine the yearly performance of a seven-cell facultative waste stabilization lagoon system

treating domestic wastewater from a community with a population of 471 persons and to compare this actual performance with criteria used to design the lagoon system and to evaluate existing lagoon design equations.

The final effluent biochemical oxygen demand (BOD-5) concentration of the system never exceeded 20 mg/l and only exceeded 10 mg/l during 4 of the 13 months studied. The final effluent suspended solids concentration was less than 30 mg/l during 11 of the 13 months studied and exceeded 10 mg/l during 5 of the 13 months studied. The effluent coliform concentration never exceeded 200/100 ml throughout the entire study.

Data collected during the study were used to evaluate recommended lagoon design criteria (i.e., organic loading rate) and lagoon design equations proposed by Gloyna, Marais, and Thirumurthi. The evaluation suggested that significant modifications to existing lagoon design procedures is needed. (AU)

ACC# : L000824
AUTHOR: Bowley, W., Healy, K.A., Helfgott, T., Laak, R.
AFFIL : Civil Engineering Dept., Univ. of Connecticut, Storrs, Conn.
TITLE : Wastewater Disposal Systems in Unsewered Areas - Final Report
SOURCE: Civil Engineering Dept., Univ. of Connecticut, Storrs, Conn. (209 pages)
YEAR : 1973
TEXT : This dual-purpose study examined the presently approved wastewater disposal site evaluation methods and used this data to aid in the development of more accurate and meaningful test procedures. The feasibility of leach field backwashing for more reliable operation was investigated, and detailed descriptions for the many individual research projects associated with the study are attached. The projects included a backwashable cloth filter to replace absorption field lines. Mass accumulation on the cloth and clogging by filtration, septic tank effluent characteristics, and the effect on frequency and duration of septic tank effluent discharge on soil clogging were studied. Two projects dealing with soil clogging, the physical modeling of septic tank soil adsorption system, and development of a backwashable leaching field model complete the laboratory investigations. These laboratory studies were followed up by field investigations. Results of lab and field experiments are presented in graphic and tabular form. (SWF)

ACC# : L000825
AUTHOR: Otto, C.J.
AFFIL : Royer Foundry and Machine Co.
TITLE : The Clivus Multrum Composting Toilet
SOURCE: Compost Science, Nov.-Dec. 1974:28-29 (2 pages)
YEAR : 1974
TEXT : A general description of the Clivus Multrum brand composting toilet is presented along with a system diagram. Advantages and disadvantages of the Clivus Multrum system are discussed and compared with the Mulltank brand. (SWF)

ACC# : L000826
AUTHOR: Kuhlthau, R.H.
AFFIL : Energy, Water and Telecommunications Department, The World Bank
TITLE : Country Studies in Appropriate Sanitation Alternatives
SOURCE: The World Bank - Energy, Water and Telecommunications Dept. (182 pages)
YEAR : 1979
TEXT : Case studies were carried out in 34 communities in 11 countries as part of a World Bank research project on appropriate technology for water supply and waste disposal in developing countries. Countries and communities were selected to obtain a diverse sample of existing sanitation technologies operating under a variety of physical and economic conditions. Presented are the technical, economic and social information collected by the local field consultants at each site. (SWF)

ACC# : L000827
AUTHOR: N/A
AFFIL : Mid-Ohio Regional Planning Commission
TITLE : An Inventory and Analysis of Existing Evapotranspiration/Soil Adsorption System in Franklin County, Ohio
SOURCE: Mid-Ohio Regional Planning Commission (102 pages)
YEAR : 1979
TEXT : This Franklin County, Ohio, study of 83 systems determined site conditions where the evapotranspiration/soil absorption system can operate, compared design assumptions with actual system capabilities, related fundings to county water quality and development issues, and recommended policy and alternatives for existing and potential problems. Eighty-three systems were identified in the county. Factors considered were ETA site limitations, household characteristics, health of trees on the

system, and design, construction and maintenance concerns. Problems were found in system design, placement, and aerobic unit dependability. The wide range of problems observed indicate administration and maintenance shortfalls as well as design and construction problems. (SWF)

ACC# : L000828
AUTHOR: Howells, D., Uiga, A.
AFFIL : University of North Carolina Research Institute
TITLE : Let's Consider Land Treatment, Not Land Disposal
SOURCE: Civil Engineering, ASCE, March 1976:60-62 (3 pages)
YEAR : 1976
TEXT : The general advantages of land application of wastewater are discussed. Topics considered are: a) pretreatment requirements, b) disinfection requirements, c) groundwater degradation, d) effects on surface water, e) application rates, f) hydraulic considerations, and g) economics. (SWF)

ACC# : L000829
AUTHOR: Feachem, R., Cairncross, S.
AFFIL : The Ross Institute of Tropical Hygiene, London School of Hygiene and Tropical Medicine, Keppel Street, (Gower Street), London, England
TITLE : Small Excreta Disposal Systems
SOURCE: The Ross Institute Information and Advisory Service, Ross Bulletin 8, Jan. 1978 (55 pages)
YEAR : 1978
TEXT : This booklet, written at the high school graduate level, describes the range of technologies available for excreta disposal in small communities of developing nations. Each system is simply described with many diagrams, and design formulas are included where appropriate. Sanitation systems included in this booklet are pit latrines, bucket and cartage systems, vault and vacuum truck systems, aqua privies, septic tanks, combined shower-latrine, soakaways (soil absorption), and waste stabilization ponds. (SWF)

ACC# : L000830
AUTHOR: Brown, R.M.
AFFIL : National Sanitation Foundation, Ann Arbor, MI
TITLE : Establishing and Achieving the Possible
SOURCE: Individual Onsite Wastewater Systems - Proceedings of the Second National Conference, Ann Arbor Science Publishers, Inc., P.O. Box 1425, Ann Arbor, MI 48106, 199-206 (5 pages)
YEAR : 1977
TEXT : A proposed strategy is presented for identifying and defining the issues and actions necessary for improving public administration of wastewater facilities. The philosophy and policies for implementing this plan are described from the vantage point of a state regulatory agency official. (SWF)

ACC# : L000831
AUTHOR: Smith, D.K., Laughton, R.V.
AFFIL : Ontario Research Foundation
TITLE : Development of Two Sewage and Solid Waste Treatment Systems with Potential for Water Reuse and Energy Recovery
SOURCE: Proceedings of the Water Reuse Symposium, 2:671-680 (10 pages)
YEAR : 1979
TEXT : Two different wastewater treatment systems were designed to renovate wastewater to a quality suitable for reuse. The Environmental Service Module is designed for military use and involves a combined wastewater purification and solid waste disposal system. Recycled water is useable for any purpose other than drinking and culinary use. The second system is designed for domestic application as part of an integrated waste management system called CANWEL (Canadian Water Energy Loop). The CANWEL system was designed to treat all liquid and solid wastes from a community of 500-1000 people. (SWF)

ACC# : L000832
AUTHOR: Pickford, J.A.
AFFIL : Loughborough University of Technology
TITLE : Control of Pollution and Disease in Developing Countries
SOURCE: Water Pollution Control, 78(3):239-253 (15 pages)
YEAR : 1979
TEXT : Control of pollution and disease in developing countries through wastewater treatment is discussed. Adequate sanitation and the development of safe water supplies are the main efforts of disease control. The use of conventional and alternative wastewater treatment systems is discussed. Suggested alternatives include latrines and privies. Stabilization ponds are suggested as an appropriate method for conventional treatment. An important consideration is the stimulation of international aid for treatment works construction and the development of

trained manpower within the developing countries. (SWF)

ACC# : L000833
AUTHOR: Milnes, T.R., Smith, N.
AFFIL : Milnes Engineering, Inc.
TITLE : Community Action at Quaker Lake - A Low Pressure Sewer System with Aerated Lagoons
SOURCE: Water Pollution Control Association of Pennsylvania Magazine, Nov.-Dec., 1978:6-11 (6 pages)
YEAR : 1978
TEXT : Community action by residents living around Quaker Lake, in Susquehanna County, Pennsylvania, prevented eutrophication of the lake. A wastewater treatment system consisting of pressure sewers and aerated earthen lagoons provides the required tertiary treatment. The pressure sewer system consists of grinder pumps and pressure mains. The lagoon system utilizes two lagoons with a depth of ten feet and a 750,000 gallon capacity. The system typically provides effluent BOD and suspended solids of less than 5 mg/l and 25 mg/l, respectively. Construction financing was arranged through a Farmers Home Administration loan and grant and a community sewer revenue bond issued for a total cost of $400,000. (SWF)

ACC# : L000834
AUTHOR: Serfling, S.A., Mendola, D.
AFFIL : Solar AquaSystems, Inc.
TITLE : The Solar Aquacell AWT Lagoon System for the City of Hercules, California
SOURCE: Proceedings of the Water Reuse Symposium, Vol. 1:671-680 (10 pages)
YEAR : 1979
TEXT : This paper presents an innovative wastewater treatment system in California which utilizes aerated lagoons, aquaculture and solar energy. The Solar Aquacell lagoon wastewater treatment system is designed to produce a range of effluent water quality for multiple reuse options, as well as recycle 100 percent of the harvested aquatic plants, solids and digested sludge into reusable by-products for community use. Water reuse options include irrigation, industrial coolant, stream enhancement and groundwater recharge. The system consist of three anaerobic stage ponds, followed by a facultative pond and a third phase aerobic/aquatic plant pond. Sand filtration and ozone disinfection are used for tertiary effluent needs. The ponds are enclosed in double polyethylene to provide greenhouse conditions for the aquatic plants. Advantages of this system include lower construction, operation and maintenance expense, improved solids handling and reuse, improved process stability and reliability and small land area requirement. (SWF)

ACC# : L000835
AUTHOR: Lussier, D., Brunk, J.
AFFIL : EPA Center for Environmental Research Information and Civil Engineering Student, University of Cincinnati, respectively
TITLE : EPA's Innovative and Alternative Technology Program
SOURCE: Pollution Engineering, 11(11):33-36 (4 pages)
YEAR : 1979
TEXT : The Clean Water Act of 1977 amended sections of the 1972 Federal Water Pollution Control Act. This new act provides increased funding of wastewater treatment facilities from 75 to 85 percent for innovative or alternative technology utilization. A provision for 100 percent funding to replace or modify an I/A facility that fails within the first two years of operation is included. I/A technologies stress water, nutrient, and natural resource reuse, energy conservation, cost effectiveness and improved toxic management. A list of EPA approved alternative systems is given, along with criteria that may be met to make alternative technologies fit into the innovative classification. (SWF)

ACC# : L000836
AUTHOR: Witt, M.D.
AFFIL : University of Wisconsin, Madison
TITLE : Water Use in Rural Homes
SOURCE: Small Scale Waste Management Project - University of Wisconsin, Madison (30 pages)
YEAR : 1974
TEXT : A study of eleven rural homes was conducted to determine the contributions made to the volume of wastewater on a day-to-day and an hourly basis. High and low flows and changes in flow patterns from summer to winter were also examined. The water use was assigned to six events: 1) toilet, 2) laundry, 3) bath or shower, 4) dishes, 5) water softener, and 6) others. Organizational charts and graphs are provided. Possible flow reductions by the use of various water saving techniques were estimated for each home in the study. (AU/SWF)

ACC# : L000837
AUTHOR: Maestas, E.T., Clark, J.W.
AFFIL : Dept. of Civil Engineering, New Mexico State Univ. Las Cruces, NM 88003
TITLE : Treatment of Septic Tank Effluent
SOURCE: New Mexico Water Resources Research Institute, New Mexico State University, Box 3167, Las Cruces, NM 88003 (93 pages)
YEAR : 1978
TEXT : Tertiary treatment of septic tank effluent was researched. Treatment occured in a separate tank with aerobic conditions provided by eletrolysis of water. The main criterion for evaluation of the electrolysis system was COD removal. From the data, it was concluded that the design of this system rests on one parameter--the area of the electrode. Treatment by this method was found to be effective and had low maintenance requirements. (SWF)

ACC# : L000838
AUTHOR: McClelland-NI (editor)
AFFIL : National Sanitation Foundation
TITLE : Individual Onsite Wastewater Systems - Proceedings of the Second National Conference, 1975
SOURCE: Ann Arbor Science Publishers, Inc., P.O. Box 1425, Ann Arbor, MI 48106 (218 pages)
YEAR : 1977
TEXT : Thirty-two leading authorities examine major aspects of the subject - including subsurface disposal methods, water conservation, viral and bacterial contamination, soil hydraulic conductivity, site selection and correction of failed systems. The book pays special attention to the problem of environmental control vs. unlimited growth with a dialogue between representatives of the regulatory, private land development and citizen's points of view.

The 1975 Proceedings contain: Keynote Address - Environmental control Versus Unlimited Growth; The State Legislator's Position; The Citizen Land Developer's Position; The Impact of Onlot Systems on Land Development-A Citizen's View; Problems and Solutions of Onlot Sewage Disposal; Subsurface Disposal Methods; Wastewater Recycling and Water Conservation; Virus in Groundwater; The Effects of Effluents on Groundwater: Bacteriological Aspects; The Washington Scene and Environmental Health; Renovation of Sewage Effluents by the Soil; Measurement of Soil Hydraulic Conductivity and Site Selection for Liquid Waste Disposal; Influence of Climate on Subsurface Disposal of Sewage Effluent; Causes and Remedy of Failure of Septic Tank Seepage Systems (L000032); Ten-State Approach to Design Standards for Individual Onsite Wastewater Systems; Adequacy and Uniformity of Regulations for Onsite Wastewater Disposal - Local Concern; The Adequacy and Uniformity of Regulations for Onsite Wastewater Disposal-A State Viewpoint (L000156); Rural Wastewater Research; A Look Into the Future; Establishing and Achieving the Possible (L000830); Conference Summary.

The number following a title indicates the article is included in the Clearinghouse database. Additional articles may be individually abstracted and can be found by title in the index. (AU/SWF)

ACC# : L000839
AUTHOR: Reynolds, J.H., Middlebrooks, E.J., Middlebrooks, C.H.
AFFIL : Division of Environmental Engineering, Utah State Univ., Logan, UT 84322
TITLE : Lagoons for Small Wastewater Flows
SOURCE: Individual Onsite Wastewater Systems - Proceedings of the Fifth National Conference, Ann Arbor Science Publishers, Inc., P.O. Box 1425, Ann Arbor, Michigan 48106 (27 pages)
YEAR : 1979
TEXT : Discusses the performance and design of facultative and aerated lagoon systems treating flows of less than 0.6 million gallons per day. Stresses selected site descriptions, lagoon performance for BOD, suspended solids and fecal coliform removal and techniques for polishing pond effluent. Studies show final effluent BOD concentrations can be maintained below 30 mg/l by properly designed and operated systems. Suspended solids concentration was low (less than 30 mg/l) during cold weather but may increase during warm periods. Polishing techniques discussed include intermittent sand filters, controlled discharge and land application. (SWF)

ACC# : L000840
AUTHOR: N/A
AFFIL : The Environmental Control Branch - Dept. of Mines, Resources Management and Environment
TITLE : Private Sewage Disposal Systems - Information Series No. 14
SOURCE: The Environmental Control Branch - Dept. of Mines, Resources Management and Environment, Winnipeg, Manitoba-Canada (28 pages)
YEAR : 1977

TEXT : Provides information on the requirements for installing and operating private sewage disposal systems in Manitoba, Canada, and reviews types of septic tanks and disposal fields permitted along with detailed standards and design regulations. Types of disposal areas included are a) subsurface fields, b) above ground filters and c) modified systems. (SWF)

ACC# : L000841
AUTHOR: N/A
AFFIL : Brown & Caldwell Consulting Engineers
TITLE : Alternatives for On-Site Sewage Treatment and Disposal
SOURCE: Oregon Department of Environmental Quality, 1234 S.W. Morrison St., Portland, Oregon 97205 (20 pages)
YEAR : 1975
TEXT : Presents a summary report on the evaluation of alternatives for on-site sewage treatment and disposal in the State of Oregon. It describes the results of a review of available literature, evaluates the alternatives and specifies both state and federal regulations pertinent to those alternatives. (SWF)

ACC# : L000842
AUTHOR: Berry, D.E., Donnelly, R.M.
AFFIL : Division of Environmental Health Sciences, Erie County, Department of Health, Buffalo, New York
TITLE : Experiences with Mound Systems in Erie County, New York
SOURCE: Individual Onsite Wastewater Systems - Proceedings of the Fifth National Conference 1978, Ann Arbor Science Publishers, Inc., P.O. Box 1425, Ann Arbor, Michigan 48106 (11 pages)
YEAR : 1979
TEXT : Presents an analysis of performance data on mound and other soil absorption systems based on a 1976 testing program. There was no significant difference in performance of conventional absorption systems and mound systems during the first 25 years of operation. Mound and subsurface sand filter systems are desirable when existing soil conditions prevent use of conventional, in-ground disposal systems. (SWF)

ACC# : L000843
AUTHOR: Wolf, R.
AFFIL : N/A
TITLE : Greywater in the Garden
SOURCE: Organic Gardening and Farming, July 1977:83-86 (4 pages)
YEAR : 1977
TEXT : Limited water supplies make greywater use practical and economic for the home garden. Usable greywater sources include bathroom tub and sink, washing machine, dishwasher and kitchen sink. Diagrams show greywater filtration systems and point out the potentially toxic or harmful effects of certain greywater components. (SWF)

ACC# : L000844
AUTHOR: Johnson, B.A., Wight, J.L., Bowles, D.S., Reynolds, J.H., Middlebrooks, E.J.
AFFIL : Utah Water Research Laboratory
TITLE : Waste Stabilization Lagoon Microorganism Removal Efficiency and Effluent Disinfection With Chlorine
SOURCE: Municipal Environmental Research Laboratory, Office of R & D, U.S. EPA, Cincinnati, OH 45268, EPA-600/2-79-018 (385 pages)
YEAR : 1979
TEXT : This project had two major objectives: (1) to evaluate the amenability of algae-laden lagoon effluent to chlorine disinfection, and (2) to evaluate the performance of a multi-cell lagoon system in removing coliform bacteria by natural means without the need for disinfection.

Results indicated that adequate disinfection was obtained with combined chlorine residual within a contact period of 60 minutes. Filtered effluent was found to exert less chlorine demand than unfiltered. Temperature, sulfide, and total chemical oxygen demand were the most important factors affecting the chlorine dose necessary to achieve a specified bacteriological quality. A mathematical model was developed and a series of design curves were constructed for use in selecting the optimal chlorine dosage needed for achieving prescribed levels of disinfection.

Total and fecal coliform removal in the lagoon system was related to hydraulic residence time. Coliform die-away rate was 16 times greater in summer months than in winter months. (AU)

ACC# : L000845
AUTHOR: Duffer, W.R., Moyer, J.E.
AFFIL : Robert S. Kerr Environmental Research Lab
TITLE : Municipal Wastewater Aquaculture

SOURCE: Robert S. Kerr Environmental Research Lab., Office of R & D, USEPA, Ada, OK 74820, EPA-600/2-78-110 (June 1978) (54 pages)
YEAR : 1978
TEXT : The developmental status of the aquacultural alternative for treatment and reuse of municipal wastewater is reviewed. Major emphasis is given to the reduction or fate of pollutants in such areas as organics, solids, nutrients, heavy metals, residual hydrocarbons, and potentially pathogenic organisms. Economic assessments of treatment and production rates for organisms are included for several types of aquacultural processes. Aquacultural systems considered include natural wetlands, artificial wetlands, macrophytes, invertebrates, fish, and integrated or food chain units. Areas having high potential for further research and development are identified. (AU)

ACC# : L000846
AUTHOR: Reilly, R. P.
AFFIL : Northeastern Illinois Planning Commission, 400 W. Madison St., Chicago, IL 60606
TITLE : Flow and Waste Reduction Measures
SOURCE: Publications Distribution Office, Northeastern Illinois Planning Commission, 400 W. Madison St., Chicago IL. 60606 (28 pages)
YEAR : 1976
TEXT : A product of the 208 Areawide Waste Treatment Management Planning Project for Northeastern Illinois, this paper presents an initial overview of measures that might be considered for flow and wastewater reduction in terms of technical, economic and political feasibility. Topics discussed are improved water system supply management, controlled sewer inflow and infiltration, reduced industrial flows, and reduced domestic use. (SWF)

ACC# : L000847
AUTHOR: Feachem, R.G., Bradley, D.J., Garehek, H., Mara, D.D.
AFFIL : The World Bank
TITLE : Health Aspects of Excreta and Wastewater Management - Part 2
SOURCE: Energy, Water and Telecommunications Department, The World Bank (351 pages)
YEAR : 1978
TEXT : This is part II of a two part book dealing with public health and the design and implementation of improved excreta disposal systems. This section contains chapters on bacterial, virus, protozoan, and helminth related diseases. A description of each disease is given as well as the occurrence, reservoir, transmission mode, incubation period, period of communicability, and resistance associated with agent causing the disease. Control measures and the agents' survivability outside the host are reviewed. The last sections of each chapter deal with the agents' removal in sewage treatment works, latrines, privies, and their life span in sludge treatment. A list of abstracts dealing with the particular disease is given at the end of each chapter. (SWF)

ACC# : L000848
AUTHOR: Hancock, N.
AFFIL : James F. MacLaren Limited, Consulting Engineers, Planners and Scientists, 435 McNicoll Ave., Willowdale, Ont, M2H 2R8, Canada
TITLE : Radical Sewer System Overcomes Difficult Conditions
SOURCE: Engineering and Contract Record, Jan. 1978 (3 pages)
YEAR : 1978
TEXT : Due to current high-water levels of Lake Ontario and no gravity fall-off on the Toronto Islands, a low pressure, shallow depth sewerage system was installed. Frost cover, styrofoam and polyethylene tape insulate the polyethelene piping, manholes, and valve chambers. The islands are a popular recreation and visitors area in the summer but a less populated area in the winter, causing uneven sewage loads and requiring two systems to be installed: a year-round perimeter system and a central recreation system. Five hp. centrifugal grinder pumps serve large facilities while 1 hp serve the smaller. Both systems are designed for annual flushing to prevent sediment build-up and freezing if the lines are not being used. (SWF)

ACC# : L000849
AUTHOR: N/A
AFFIL : James F. MacLaren Limited, Consulting Engineers, Planners and Scientists, 435 McNicoll Ave., Willowdale, Ont., M2H 2R8 Canada
TITLE : A New Sewerage System Developed for Temagami Expected to Cut Costs By 50%
SOURCE: CIVIC, April 1977 (4 pages)
YEAR : 1977
TEXT : Designed for a population of 600, this grinder pump, low-pressure sewer system will serve the Village of Temagami where the bedrock is on the surface or just below. The shallow buried system eliminates the expen-

sive deep rock blasting and eliminates the need for sewage lift stations. The system includes grinder pumps, 50 gallon or larger holding tanks, 1 1/2 inch connecting lines, 2 to 4 inch insulated street mains and electric heating cables with low temperature sensors. The heating cables will thaw lines frozen due to power outages and keep lines thawed while residents are away on winter holidays. (SWF)

ACC# : L000850
AUTHOR: N/A
AFFIL : Montana State University
TITLE : Septic Tanks
SOURCE: Cooperative Extension Service Bulletin 332, Montana State University, Bozeman, Montana (14 pages)
YEAR : 1979
TEXT : Information on septic systems compiled by the Cooperative Extension Service of Montana State University. Presents guidelines concerning design and site selection for septic systems. Describes soil percolation tests and drainfield construction. Lists possible causes of septic system failures and provides diagrams detailing septic tank and soil absorption field construction. (SWF)

ACC# : L000851
AUTHOR: N/A
AFFIL : NSF Joint Committee on Wastewater Technology
TITLE : National Sanitation Foundation Standard No. 41 for Wastewater Recycle/Reuse and Water Conservation Devices
SOURCE: National Sanitation Foundation, NSF Building, Ann Arbor, MI 48105 (42 pages)
YEAR : 1978
TEXT : This standard establishes guidelines for the evaluation of devices intended for processing blackwater and greywater generated by humans. These minimum requirements include materials, design, construction, labeling, and performance. Covered by this standard are water or oil carriage blackwater devices, greywater devices, integrated greywater devices which recycle or reuse treated process fluid, composting toilets, incinerators, pressure differential and other water conservation devices. (SWF)

ACC# : L000852
AUTHOR: Hendricks, D.W., Post, F.J., Khairnar, D.R.
AFFIL : Dept. of Civil Engineering, Colorado State University, Fort Collins, CO 80525
TITLE : Adsorption of Bacteria on Soils: Experiments, Thermodynamic Rationale, and Application
SOURCE: Water, Air and Soil Pollution, 12(2):219-232 (14 pages)
YEAR : 1979
TEXT : A model for the adsorption of bacteria to soil particles is described using the physical-chemical Langmuir isotherm and the van't Hoff equation. An example of the use of the model for assessing bacterial movement through soil is provided. "Staphylococcus aureus" was the sorbate with sorbents of activated charcoal, kaolinite clay, Mendon silt loam, and silica sand. Competitive agents sodium lauryl sulfate, sodium chloride, and peptone were also studied. Peptone was the most successful competitor with the bacteria for sites on the sorbent. (AU)

ACC# : L000853
AUTHOR: Sutherland, J.C., Bevis, F.B.
AFFIL : Williams and Works, Inc., Grand Rapids, MI
TITLE : Reuse of Municipal Wastewater by Volunteer Fresh-Water Wetlands
SOURCE: Water Reuse Symposium, Vol. 1 (20 pages)
YEAR : 1979
TEXT : The municipal wastewater treatment system at Vermontville, Michigan (pop. 975), consists of two facultative stabilization ponds followed by four surface irrigation fields. The facility was studied to identify and evaluate features of the wastewater-wetland complex that would make it a feasible alternative among small community wastewater treatment systems. Phosphorus and nitrogen concentrations were monitored through the system. Phosphorus concentrations in the irrigation fields actually increased at times, but overall removals averaged 95 percent in the soil. A certain degree of nitrification-denitrification also takes place in the system. Nutrient uptake by wetland plants was also studied. Capital and O & M cost studies indicate this method is competitive for treating small flows. (SWF)

ACC# : L000854
AUTHOR: N/A
AFFIL : Energy, Water and Telecommunications Department, The World Bank
TITLE : Appropriate Sanitation Alternatives: A Technical and Economic Appraisal

- Summary Report
SOURCE: Energy, Water and Telecommunications Department, The World Bank, P.U. Report No. RES 20 (47 pages)
YEAR : 1979
TEXT : This report presents the results of two years of field studies undertaken by the World Bank in 39 communities in 14 countries around the world to identify appropriate technologies for sanitation in developing countries. It summarizes the broad technical, economic, health, and social findings of the research, and it discusses the aspects of program planning necessary to implement the findings. Useful to planning officials and policy advisors working in, or for, less developed countries. (SWF)

ACC# : L000855
AUTHOR: Feachem, R.G., Bradley, D.J., Garelick, H., Mara. D.D.
AFFIL : The World Bank
TITLE : Health Aspects of Excreta and Wastewater Management - Part 1
SOURCE: Energy, Water and Telecommunications Department, The World Bank (229 pages)
YEAR : 1978
TEXT : Part one of a two part book deals with the effects on public health brought about by the design and implementation of improved excreta disposal projects. It provides information on the control of disease attributed to improvements in excreta disposal systems and the ways in which particular excreta disposal and reuse technologies affect the survival and dissemination of particular pathogens. Part 1 presents a clear and concise review of available knowledge on excreta, nightsoil, sewage and health. This book is intended for economists, engineers, health workers and planners, and it has been written with a minimum of technical jargon so that it can be readily understood by people from differing professional backgrounds. (SWF)

ACC# : L000856
AUTHOR: Winneberger, J.T.
AFFIL : Consultant, On-Site Wastewater Disposal
TITLE : The Principle of Alternation of Subsurface Wastewater Disposal Fields
SOURCE: Research and Development, Hancor, Inc., Findlay, OH (15 pages)
YEAR : 1976
TEXT : The principles and advantages of using alternating subsurface disposal fields are discussed. Soil characteristics and the effects on soil after water percolation are described. Changes in soil permeability due to mechanical and biological mechanisms are considered in detail. Design suggestions are given for alternating bed layout and for use of valves, distribution boxes, and breather pipes. (SWF)

ACC# : L000857
AUTHOR: Hill, D.E., Frink, C.R.
AFFIL : N/A
TITLE : Longevity of Septic Systems in Connecticut Soils
SOURCE: The Connecticut Agriculture Experiment Station, Bulletin 747 (22 pages)
YEAR : 1974
TEXT : A field survey of septic system longevity is described including influence of soil type, repairs, and health codes. Since 1960, 493 of 2845 systems have failed, and their half-life has been 27 years. The rating system of soils for on-site disposal of slight, moderate, and severe was not entirely consistent with performance and various modifications are suggested. It was concluded that leaching field sizes should be based on percolation tests, deep observations, and knowledge of soil type. Percolation tests should be conducted in the spring when water tables are high rather than during dry seasons. (SWF)

ACC# : L000858
AUTHOR: Brown and Caldwell, Consulting Engineers, Eugene, OR
AFFIL : Brown and Caldwell, Consulting Engineers
TITLE : An Evaluation of Alternatives for On-Site Sewage Treatment and Disposal
SOURCE: Oregon Department of Environmental Quality (143 pages)
YEAR : 1975
TEXT : The Oregon Department of Environmental Quality has the responsibility of regulating on-site sewage treatment and disposal systems for individual homes. At this time approximately four percent of the households use septic tanks and subsurface drainfields. Recently, alternatives to the conventional septic tank system have been developed. Those alternatives were evaluated according to their suitability for use in the State of Oregon. The alternatives were evaluated and rated in terms of regulation compliancy, life expectancy, reliability, construction regulations, operation and maintenance and cost. Alternatives investigated included holding tanks, recycle systems, self-contained toilets, composting toilets, mechanical oxidation systems, lagoon systems, chlorination and filtration systems, mound systems, evapotranspiration beds, and surface

spreading. Of these, the recycle, self-contained toilets, mechanical oxidation, and mound systems were judged conditionally acceptable overall. The rest were unacceptable. (SWF)

ACC# : L000859
AUTHOR: Carpenter, J.W., Jr.
AFFIL : Kentucky State Department of Health
TITLE : Individual Sewage Disposal Prototype Study
SOURCE: Kentucky State Department of Health, 108 South Kentucky Avenue, Corbin, Kentucky 40701 (17 pages)
YEAR : 1971
TEXT : A study by the Kentucky State Department of Health was conducted to test innovative sewage disposal systems and their suitability for use in eastern Kentucky. Generally, this area is geographically unsuited for conventional sub-surface disposal systems. Systems investigated included those which reduced wastewater volumes, organic loads from the homes or increased soil adsorption efficiency. In addition, manufactured percolation systems were tested. The only conclusions drawn were those with respect to incinerating toilets, which were judged to be satisfactory. (SWF)

ACC# : L000860
AUTHOR: Martin, T.E.
AFFIL : Department of Building Construction, University of Florida
TITLE : Septic Tank Systems - The Need for Research
SOURCE: On-Site Waste Management, Vol. 1 (15 pages)
YEAR : 1971
TEXT : This paper examines the pollution potential of a typical septic tank system compared with a municipal sewer system. Some design criteria are given for both the tank itself and the drainage field. Mound systems are also briefly discussed. Current research includes BOD monitoring of the septic tank influent, effluent and the surrounding groundwater. Future research projects include filtering of the septic tank effluent. (SWF)

ACC# : L000861
AUTHOR: Aldworth, G.A.
AFFIL : James F. MacLaren, Ltd., Toronto, Canada
TITLE : A New Concept in Small Water Systems
SOURCE: 1975 Joint Conference, Ontario Section AWWA and Ontario Municipal Water Association - Pollution Control Association of Ontario (30 pages)
YEAR : 1975
TEXT : Two water and wastewater systems and one water system for colder climates and rocky terrain are descrited. Objectives, highlights, and system descriptions are included. One dual system, designed to be easily transfered to a USAF base, utilized wastewater collection by a pressurized feed system containing small grinder pump units in individual shelters. A rigorous testing procedure to obtain flexibility and durability of the system was performed. The second dual system, designed for a full-sized community, recommended a water distribution system with shallow buried lines with special heating, insulation and recirculation techniques. Pressure sewers were buried in a common trench with the water lines. Cost reduction is the major advantage. (SWF)

ACC# : L000862
AUTHOR: Peterson, M.E.
AFFIL : Indian Health Service, PHS, DHEW, Office of Environmental Health, 1212 South Judkins, Seattle, Wash. 98144
TITLE : Soil Percolation Tests
SOURCE: Journal of Environmental Health, 42(4):182-186 (5 pages)
YEAR : 1980
TEXT : The standard soil percolation test commonly used to evaluate site suitability and design criteria for on-site waste disposal systems is prone to great error which results in over-designing and under-designing systems. Use of a perc tube for percolation testing is shown to be simpler and more accurate. A recommended percolation test procedure is described. (AU)

ACC# : L000863
AUTHOR: N/A
AFFIL : N/A
TITLE : On-Site Treatment for Low-Density Areas
SOURCE: American City and Country, April 1980:45-48 (4 pages)
YEAR : 1980
TEXT : In low density areas, on-site treatment is often the most cost-effective solution. The article provides six options for on-site systems. The topics discussed are: 1) septic tanks with leaching field, 2) sand mounds, 3) lagoons or ponds, 4) evapotranspiration beds, 5) sand filtra-

tion, and 6) package treatment units. Advantages and limitations of each system are given along with some cost information. (SWF)

ACC# : L000864
AUTHOR: Eschwege, H.
AFFIL : U.S. General Accounting Office
TITLE : Septic Systems Can Be Viable, Low-Cost Alternatives
SOURCE: Water and Sewage Works, 127(3):40, 50-51 (3 pages)
YEAR : 1980
TEXT : Septic systems are endorsed as an effective long-term tool for wastewater disposal. Septic systems can: 1) provide as good or better treatment than central systems, 2) use less energy, and 3) replenish groundwaters. The article discusses system longevity, design problems (including soil absorption ability), primary reasons for septic systems failure, operation and maintenance problems, and cost effectiveness. (SWF)

ACC# : L000865
AUTHOR: Feachem, R.G., Mara, D.D., Iwugo, K.C.
AFFIL : Energy, Water and Telecommunications Department, The World Bank
TITLE : Alternative Sanitation Technologies for Urban Areas in Africa
SOURCE: Energy, Water and Telecommunications Dept., The World Bank, P.U. Report No. RES 22 (199 pages)
YEAR : 1979
TEXT : The results of field studies carried out in five African countries as a part of a World Bank research project on appropriate technology for water supply and waste disposal are summarized in this report. Four sanitation technologies currently used in urban Africa: pit latrines, composting toilets, bucket latrines and aquaprivies are discussed as to their technical, economic, institutional, social and health requirements and constraints. Methods for technology comparison and selection are suggested, and areas for future research are indicated. (SWF)

ACC# : L000866
AUTHOR: N/A
AFFIL : Oregon Department of Environmental Quality
TITLE : On-Site Sewage Disposal in Oregon
SOURCE: Oregon Department of Environmental Quality, 1234 S.W. Morrison, Portland, Oregon 97205 (28 pages)
YEAR : 1976
TEXT : The on-site sewage disposal program of the Oregon Department of Environmental Quality is assessed. Its progress, problems and future issues requiring legislative attention are discussed. At the time the paper was written the approved alternative treatment systems were stabilization ponds, land irrigation and holding tanks. State regulations regarding septic tank installation are also given. (SWF)

ACC# : L000867
AUTHOR: N/A
AFFIL : New York State Department of Health, Division of Sanitary Engineering
TITLE : Waste Treatment Handbook, Individual Household Systems
SOURCE: New York State Department of Health (40 pages)
YEAR : 1979
TEXT : A handbook prepared by the New York State Department of Health provides standards for the design, construction and maintenance of household sewage disposal systems. The handbook applies to systems receiving domestic-type sewage quantities of less than 1000 gallons per day. Conventional, alternative and non-waterborne systems are described. A glossary and design diagrams are included. (SWF)

ACC# : L000868
AUTHOR: Zaltzman, R.
AFFIL : Dept. of Civil Engineering, West Virginia University, Morgantown, WV
TITLE : Establishment of Roadside Rest Area Water Supply, Wastewater Carriage and Solid Waste Disposal Requirements
SOURCE: NTIS, Springfield, VA 22151 (295 pages)
YEAR : 1975
TEXT : The interstate traffic utilization, water consumption, wastewater production and characteristics and solid waste quantities and characteristics at five roadside rest areas were determined. The values ascertained were determined from data gathered mainly at the following interstate roadside rest areas: (1) Tennessee, serving both the east and west bound lanes of I-40, 60 miles east of Nashville, TN; (2) Florida, serving the south bound lane of I-75, near Lake City, FL; (3) New Hampshire, on the north bound lane of I-93, 10 miles north of Concord, NH; (4) Colorado, on the south bound lane of I-25, 16 miles south of the Fountain Interchange. The measures of the rest areas' usage were obtained by continuous (24 hr/day) monitoring with automated instrumentation and

periodical manual sampling for a period of at least one year for each rest area. (AU)

ACC# : L000869
AUTHOR: Winneberger, J.T.
AFFIL : Consultant, Septic-Tank Systems, Berkeley, California
TITLE : Correlation of Three Techniques for Determining Soil Permeability
SOURCE: On-Site Waste Management Vol. III (30 pages)
YEAR : 1974
TEXT : The following parameters were correlated in an analysis of proceedures used to define soil permeability: 1) The percent clay in a soil derived from a common parent material, 2) measurements of the coefficient of permeability with a modified version of more complex constant-head permeameters, and 3) one percolation-test procedure used in septic-tank practices.

It was asserted that skills of technicians are not equal and the nature of the permeameter and percolation tests is such that technicians' skills are critical. Replicated measurements of same materials would yield a population mean and variance, depending on the particular technician. A recommended percolation test is offered in the Appendix. (AU/SWF)

ACC# : L000870
AUTHOR: Brouwer, J., Willatt, S.T., Van de Graaf, R.H.M.
AFFIL : La Trobe University and Soil Conservation Authority, Victoria
TITLE : The Hydrology of On-site Septic Tank Effluent Disposal on a Yellow Duplex Soil
SOURCE: N/A
TEXT : A trench system for on-site disposal of septic tank effluent, situated on a yellow duplex soil was monitored for several months. Observations were made on various factors affecting the pattern of flow of the effluent through the soil, and on the change in quality of the effluent while it passed through the soil. The effluent disperses mainly through interflow during wet periods and through evapotranspiration during dry periods. Purification by the soil with respect to nitrogen and phosphorus is considerable and apparently adequate. Comparison is made with two other systems also monitored, one on a similar soil and one on a krasnozem. (AU)

ACC# : L000871
AUTHOR: Amundson, G.
AFFIL : Emeritus Professor, Michigan State University and Consultant to the Michigan Vitrified Tile Company
TITLE : The Sheldon Inverted Disposal Field System
SOURCE: On-Site Waste Management, Vol. I (8 pages)
TEXT : The Sheldon System, a variation on the septic tank - soil absorption system, feeds effluent from the septic tank into the disposal field. The system uses clay drain tiles with perforations located in the upper half of the tile. The theory of the Sheldon or Inverted Tile System is to provide a water-tight conduit in the lower half of the tile line, allowing settling-out of the solids from the wastewater. The clear effluent escapes through the perforations at the top of the line. The solids can be flushed out of the line when the septic tank is cleaned. (SWF)

ACC# : L000872
AUTHOR: Van Kleeck, L.W.
AFFIL : Bowe, Albertson and Associates, Consulting Engineers
TITLE : Big Design Decisions Needed for Small Community Plants
SOURCE: Wastes Engineering, 33(10) (5 pages)
YEAR : 1962
TEXT : Discusses design of small community sewage treatment plants, with special consideration given to project cost and financing, sewer design, plant expansion, simplicity of operation, preliminary treatment, handling of industrial wastes and treatment process selections. Also discussed are the economics of secondary treatment methods and plant laboratory facilities. (SWF)

ACC# : L000873
AUTHOR: Middlebrook, E.J.
AFFIL : Utah State University
TITLE : Chlorination of Waste Stabilization Lagoon Effluent
SOURCE: 1979 U.S. EPA Technology Transfer Seminars on Wastewater Treatment Facilities for Small Communities, July 1979 (36 pages)
YEAR : 1979
TEXT : Basic theory and system design of the chlorination process with regard to lagoon effluent is discussed. Mode of action and possible hazards of chlorination are also explained. A combined chlorine residual of

1.0-1.5 mg/l will give a 99 percent kill rate when placed in contact with the microbe-laden wastewater for 30 minutes. However, variables such as sulfides, suspended solids and temperature can markedly affect this disinfection efficiency. (SWF)

ACC# : L000874
AUTHOR: Gannon, J.E., Gold, A.
AFFIL : University of Michigan, Pellston, MI
TITLE : Limnological Features of Crooked and Pickerel Lakes, Emmet County, Michigan - Part II: The Suitability of Soils for On-Site Wastewater Disposal
SOURCE: National Science Foundation (Grant No. AEN72-03483) April 1979 (21 pages)
YEAR : 1979
TEXT : A study was performed on the residences surrounding the Crooked and Pickerel Lakes in Michigan to assess the suitability of current septic systems for sewage treatment. Most of the dwellings were situated on soils with characteristics that restricted proper percolation of sewage. High groundwater tables near the lakes were an additional constraint. For those areas without adequate sites for septic systems, it was suggested that on-site alternatives be explored. (SWF)

ACC# : L000875
AUTHOR: Hilbert, M.S.
AFFIL : Director, Division of Engineering and Sanitation, Wayne County, Michigan, Department of Health
TITLE : Small Plants: Interim State in Metro Growth
SOURCE: Wastes Engineering, 33(10) (3 pages)
YEAR : 1962
TEXT : Discusses the utilization of regional small sewage treatment plants as an effective intermediate step towards solution of area-wide sewage disposal problems. Intermediate plants have been shown to aid residential, industrial and commercial development, while remaining cost-effective and environmentally sound. (SWF)

ACC# : L000876
AUTHOR: Murphy, R.F.
AFFIL : Murphy, Pulice, Associates, Inc., San Francisco, CA
TITLE : Comparison of Economics of Normal Sewage Collection and Disposal vs. Ground Disposal
SOURCE: On-Site Waste Management, Series II, Vol. V. Presented at Individual Sewage Disposal System Workshop, Cincinnati, OH. Sponsored by Mancor, Inc. (14 pages)
YEAR : 1974
TEXT : A cost comparison of ground disposal of sewage versus other conventional methods of sewage disposal is presented. Calculations for individual on-site disposal versus routine collection and disposal are based on experience with western construction costs, land costs and quality requirements. Study shows that conventional collection and disposal, without any unusual water quality concern, costs approximately twice as much as individual ground disposal. (SWF)

ACC# : L000877
AUTHOR: Plews, G.D., Lenning, D.A.
AFFIL : On-Site Waste Disposal, Washington State Dept. of Social and Health Services, Olympia, Washington
TITLE : Evaluation and Use of Alternatives in Washington (State)
SOURCE: Individual Onsite Wastewater Systems - Proceedings of the Fifth National Conference, Ann Arbor Science Publishers, Inc., P.O. Box 1425, Ann Arbor, MI 48106 (15 pages)
YEAR : 1979
TEXT : State sanitary codes are not generally conducive to the evaluation and adoption of new alternative technologies in wastewater disposal. Washington has adopted a four-point evaluation process by a statewide technical review committee. Along with a detailed document provided by manufacturers and distributers, the evaluation intends to provide interim or final guidelines by which local sanitarians can judge the merits of new systems prior to possible adoption. The advantages and flaws of local and national procedures are briefly discussed. (SWF)

ACC# : L000878
AUTHOR: Bernhart, A.P.
AFFIL : Department of Civil Engineering, University of Toronto
TITLE : Small Waste Water Units for Soil Infiltration and Evapo-Transpiration
SOURCE: On-Site Waste Management, Vol. I. (20 pages)
YEAR : 1972
TEXT : The use of septic and aerobic tanks as primary treatment units is presented with detailed graphs and tables. Effluent disposal is through

soil infiltration and evapo-transpiration. Sections include 1) research investigations comparing septic and aerobic tanks in terms of BOD, suspended solids and coliform counts; 2) recommendations for design and operation of wastewater disposal units for homes; 3) calculations of required interface area for seepage beds and seepage trenches; and 4) lot size determination for single-family homes. (SWF)

ACC# : L000879
AUTHOR: McClelland, N.I. (Editor)
AFFIL : National Sanitation Foundation, Ann Arbor, Michigan
TITLE : Individual Onsite Wastewater Systems, Fifth National Conference
SOURCE: Ann Arbor Science Publishers, Inc., 230 Collingswood, P.O. Box 1425, Ann Arbor, Michigan 48106
YEAR : 1979
TEXT : The Fifth Annual Sanitation Conference focuses on information pertinent to implementation of the Clean Water Act of 1977, including federal and state codes and approval policies, the various funding mechanisms which are currently available, field experiences, and the status of efforts to develop manuals of practice for onsite wastewater systems.

The Proceedings contain: New policies and regulations for onsite systems; The role of the Farmers Home Administration in rural community development; State overview of onsite liquid waste disposal alternatives; Past, present and potential role of NSF in onsite wastewater system technology; Alternatives to a Septic Tank/Absorption field; An approach to concept and design of wastewater treatment facilities for rural and semirural communities and fringe areas of cities; Small community facilities plans and onsite disposal - A state experience; The campaign in California for alternative systems; Solutions to problems using onsite wastewater management at Apple Valley and Three Rivers, California; Evaluation and use of alternatives in Washington; An onsite system solves a problem at the Mill on the Floss restaurant in New Ashford, Massachusetts; Treatment of pressure sewage; Lagoons for small wastewater flows; Evapotranspiration - A viable method of reuse (or disposal) of wastewater in North America, south of the 52nd or 55th parallel; Experiences with mound systems in Erie County, New York; Laboratory and family live-in experiences with domestic greywater reuse systems; Generating and analyzing alternatives; National Association of Home Builders: Alternatives to public sewer; National Environmental Health Association's onsite wastewater management manual; So you want a federal grant; The impact of the Clean Water Act of 1977 on funding of individual wastewater systems; Illinois wastewater disposal zones, and; Funding local share costs of federal clean water projects. (ed.)

ACC# : L000880
AUTHOR: Harkin, J.M., Fitzgerald, C.J., Duffy, C.P., Kroll, D.G.
AFFIL : Dept. of Soil Science, University of Wisconsin-Madison
TITLE : Evaluation of Mound Systems for Purification of Septic Tank Effluent
SOURCE: Wisconsin Technical Completion Report, Project No. OWRT B-099-WIS, Water Resources Center, University of Wisconsin-Madison (107 pages)
YEAR : 1979
TEXT : Thirty-three mound systems installed by commercial contractors in Wisconsin were surveyed and monitored in detail over a two-year period to determine whether mound systems are being designed, installed, and operated according to official state guidelines and whether such systems achieve adequate wastewater purification. The major problem with many mounds was the unadvisedly high volume of septic tank effluent applied with each dose. In consequence, bacteria and nutrients in the effluent were transported deeper into the natural soil in these systems than in systems receiving smaller, more frequent, effluent doses. A lengthy results and discussion section covers the mound performance aspects of bacterial attentuation, fate of nitrogen and phosphorus, seasonal variations in mound performance, and clogging mat formation. (SWF)

ACC# : L000881
AUTHOR: Haith, D.A., Koenig, A., Loucks, D.P.
AFFIL : Cornell University, Ithaca, NY
TITLE : Preliminary Design of Wastewater Land Application Systems
SOURCE: Water Pollution Control Federation Journal, 49(12):2371-79 (9 pages)
YEAR : 1977
TEXT : This article is a theoretical analysis of a preliminary design procedure for land application of wastewater. Mass balance relationships are developed and explained. Costs of land application are discussed. The paper uses analytical models which describe the dynamics of nitrogen and water mass balances to evaluate land application alternatives. A cost-effectiveness model for a spray irrigation system is presented. (SWF)

ACC# : L000882
AUTHOR: N/A

AFFIL : N/A
TITLE : Guidelines for Mound Systems
SOURCE: State Water Resources Control Board of California (93 pages)
YEAR : 1980
TEXT : This is a detailed technical manual suitable for direct incorporation into local California health regulations. The manual presents diagrams and tables applicable to the design of mound systems for residential wastewater disposal. Includes discussion of system rehabilitation, modifications for commercial use, trouble-shooting and prevention, and a refined soil percolation test. (SWF)

ACC# : L000883
AUTHOR: N/A
AFFIL : N/A
TITLE : Residential Greywater Management in California
SOURCE: State Water Resources Control Board of California (38 pages)
YEAR : 1980
TEXT : California's total domestic water consumption is twice, and outdoor use four times, the national average. Greywater use is a method of water conservation and a way to reduce loadings of septic tank leachfields. The report describes methods of greywater treatment, public health considerations and surveys of public acceptability. In recognition of the prevailing legal restrictions of greywater use, it suggests approaches to public education and an open-minded approach to local management and regulatory policy. (SWF)

ACC# : L000884
AUTHOR: Gupta, A.S., Kumar, A., Chakrabarty, S.P.
AFFIL : Univ. of Roorkee and Central Research Institute, Roorkee, India
TITLE : Evaluation of Water-Closet Performance
SOURCE: Indian Journal of Environmental Health, National Environmental Engineering Research Institute, Nagpur, India, 20(3):249-257 (9 pages)
YEAR : 1978
TEXT : Deals with a study on efficiencies of different types of toilet bowls and pans in combination with 10.0 and 6.5 liter capacity cisterns simulating field conditions in a multi-story experimental mockup. Tests included a flushing efficiency test, polythene ball test, and a smudge test. Conclusions from the experiments showed that toilet performance in the drainage system depended on the water seal area of the toilet, the type of trap used, the capacity of the cistern, the floor level at which the toilet has been placed, and the discharge passing through the stack. (SWF)

ACC# : L000885
AUTHOR: Johnson, B.B.
AFFIL : Clark University, Worcester, Massachusetts
TITLE : Waste Water Reuse and Water Quality Planning in New England: Attitudes and Adoption
SOURCE: Water Resources Research, 15(6):1329-34 (6 pages)
YEAR : 1979
TEXT : Consideration of wastewater reuse as a wastewater management method is required in federal water quality planning. This paper reports the result of a survey of major participants in such planning in New England. It found that only cursory consideration was given to wastewater reuse. Where one sits in the water management system significantly influences one's evaluation of reuse. Further, considerations other than economic and engineering factors will influence, indeed often determine, wastewater reuse decisions; New England officials' views of reuse were generally very conservative. (AU)

ACC# : L000886
AUTHOR: Bishop, C.S., Sikora, V.A.
AFFIL : Dept. of Environmental Health, East Tennessee State University, Johnson City, TN 37601
TITLE : Health Aspects of Urban Water Conservation
SOURCE: Journal of Environmental Health, 45(5):250-252 (3 pages)
YEAR : 1980
TEXT : Discusses some public policy aspects of water conservation as implied in the 1978 federal "water initiatives." Briefly considers the relation of the health aspects and the following methods of water conservation: pressure reduction, water-saving devices, leak reduction, recycling and water pricing. (SWF)

ACC# : L000887
AUTHOR: Gotaas, H.B.
AFFIL : University of California, Berkeley
TITLE : Composting -- Sanitary Disposal and Reclamation of Organic Wastes
SOURCE: Office of Publications and Translation, World Health Organization,

Geneva, Switzerland (194 pages)
YEAR : 1956
TEXT : Increasing food demand, coupled with decreasing soil fertility, has focused attention on the use of organic wastes to improve agricultural production. Nitrogen, phosphorus, potash and micro-nutrients necessary for plant growth are in abundant supply in night soil, sewage and manure. Lack of knowledge concerning the sanitary use and disposal of the wastes has led to the increased incidence of enteric disease, especially in the rural parts of the world. The report presents treatment methods and processes for sanitary disposal and utilization of these organic waste materials. The basic aspects of composting and current research results are discussed. Planning and methods for waste use at farms, villages, small towns and cities are included along with a description of digestors for methane recovery on farms and in villages. (SWF)

ACC# : L000888
AUTHOR: Drews, R.J.L.C., Denysschen, J.H.
AFFIL : National Institute for Water Research, Pretoria, South Africa
TITLE : Sewage Treatment Works for Small Communities -- A Need for Careful Design and Operation
SOURCE: International Conference on Water Pollution Control in Developing Countries, Bangkok, Thailand (17 pages)
YEAR : 1978
TEXT : An account is given of design faults, operational shortcoming and malfunctioning of units for small sewage works along with suggestions for the improvement of plant performance. The observations made in practice pertain mainly to facultative (stabilization) pond systems, conventional biological filter plants and to extended aeration-type activated sludge plants; they are meant to stimulate critical regular inspection of purification plants, which should lead to prompt application of practical corrective measures. Emphasis is placed on the need for properly trained, interested and motivated operators even for the smallest treatment works. (AU/SWF)

ACC# : L000889
AUTHOR: Mara, D.
AFFIL : Dept. of Civil Engineering, University of Dundee, Scotland
TITLE : Sewage Treatment in Hot Climates
SOURCE: John Wiley and Sons, New York (166 pages)
YEAR : 1976
TEXT : In this practitioner's handbook, special attention is devoted to stabilization ponds, waste reuse and aquaculture practices, since these processes show the most potential for tropical underdeveloped countries. Following basic chapters on sewage, sewage treatment, microbiology and BOD removal kinetics, there are chapters on the major central and on-site treatment facilities which cover methods of operation, design criteria, construction, and sample design calculations. Appendices provide additional information for wastewater analytical procedures and plant design. (SWF)

ACC# : L000890
AUTHOR: Otis, R.J.
AFFIL : Small Scale Waste Management Project, University of Wisconsin
TITLE : Design of Pressure Distribution Networks for Soil Absorption Fields
SOURCE: University of Wisconsin (9 pages)
YEAR : 1979
TEXT : A design methodology for pressure distribution networks for soil absorption fields is presented. Design aids are included to allow determination of pipe sizes and lengths, hole spacing, minimum volume of dose, and pump or siphon discharge. A seven-step design example is included. (SWF)

ACC# : L000891
AUTHOR: Leich, H.H.
AFFIL : Conservationist, Bethesda, Maryland
TITLE : New Options for a Sewerless Society
SOURCE: Compost Science, Summer 1976 (4 pages)
YEAR : 1976
TEXT : This is a survey article describing a number of alternatives to conventional sewage collection systems. Emphasis is given to water conservation and recycling. A number of alternatives are briefly discussed, including incinerating toilets, composting toilets, oil flush toilets, and vacuum collection systems. (SWF)

ACC# : L000892
AUTHOR: Mann, H.T., Williamson, D.
AFFIL : N/A
TITLE : Water Treatment and Sanitation -- Simple Methods for Rural Areas

SOURCE: Intermediate Technology Publications, 9 King St., London WC2E 8HN England (91 pages)
YEAR : 1976
TEXT : This handbook covers various aspects which must be considered when investigating the development of a water supply and sewage disposal scheme for a small community. It discusses water source selection and simple water testing, supply and treatment, and wastewater and excreta disposal. Also covers various sewage treatment methods, effluent and sludge disposal, and suggestions for emergency water and wastewater treatment. Contains sketches and diagrams of all systems and equipment discussed. Includes a glossary of terms. (SWF)

ACC# : L000893
AUTHOR: N/A
AFFIL : Stinson Beach County Water District, Stinson Beach, California
TITLE : Homeowners and Users Guide for Onsite Wastewater Disposal Systems
SOURCE: California State Water Resources Control Board (9 pages)
YEAR : 1979
TEXT : This guide explains in simple terms and diagrams how a septic tank and leachfield work and how it can be properly inspected and cleaned. Discusses what can go wrong with the absorption system and gives a list of maintenance tips to reduce the liquid and solid loads on a system. (SWF)

ACC# : L000894
AUTHOR: Flamm, L.E., Anderson, S.A.
AFFIL : Texas A & M University, College Station, TX
TITLE : The User-Manipulated Water Fixture: A New Target for Water Conservation
SOURCE: Mechanical Engineering, 96(12):21-25 (5 pages)
YEAR : 1974
TEXT : Reduced water consumption and lower construction costs are possible when future plumbing systems are designed for threshold use of fixtures rather than for maximum flow. Water conservation can be achieved through a combination of water-saving fixtures usage and consumer awareness. (SWF)

ACC# : L000895
AUTHOR: Wagner, E.G., Lanoix, J.N.
AFFIL : Division of Health and Sanitation, Rio de Janeiro; Public Health Engineer, WHO, Geneva
TITLE : Excreta Disposal for Rural Areas and Small Communities
SOURCE: Office of Publications and Translation, World Health Organization, Geneva, Switzerland (181 pages)
YEAR : 1958
TEXT : Provides an overview of the different methods of human waste disposal for rural and small communities. The text first introduces the public health factors of waste disposal along with social and psychological implications of rural sanitation programs. The book centers on the privy methods of excreta disposal which include design and operation standards and a listing of advantages and disadvantages of each technique. A section on water-carried disposal methods deals with septic tank operation and maintenance. The last section discusses excreta disposal programs in rural areas and critiques the planning, training, and functioning of the program and staff. (SWF)

ACC# : L000896
AUTHOR: Rupke, J. W. G., Chisholm, K.
AFFIL : Ontario Ministry of the Environment
TITLE : Upgrading of Sewage Lagoon Effluents
SOURCE: Environment Canada, Research Report No. 54 (33 pages)
YEAR : 1977
TEXT : Various unit processes were evaluated at the Strathroy, Ontario, lagoon for the purpose of upgrading conventional lagoon effluent quality. Systems to reduce both the suspended matter and also the soluble components were used. Unit processes investigated included physical-chemical treatment followed by filtration, air flotation, microstraining and the rotating biological contactor (RBC). Results indicated that a suitable system for upgrading lagoon effluent quality would involve an RBC for ammonia nitrogen and soluble BOD reduction, followed by chemical coagulation-sedimentation and multimedia filtration. Approximate costs are given for the recommended system on a cents per thousand gallon basis. (AU/SWF)

ACC# : L000897
AUTHOR: Otis, R.J., Boyle, W.C., Converse, J.C., Tyler, E.J.
AFFIL : Small Scale Waste Management Project, University of Wisconsin, Madison, Wisconsin.

TITLE : On-Site Disposal of Small Wastewater Flows
SOURCE: Environmental Protection Agency Technology Transfer (91 pages)
YEAR : 1977
TEXT : Discusses research by the University of Wisconsin into the on-site disposal of wastewater. The Small Scale Waste Management Project investigated the use of soil for treatment, and wastewater disposal research was aimed at determining the causes leading to septic tank-soil absorption field failure, improving of site characterization methods, system design and system construction for on-site wastewater disposal, finding effective alternatives to the septic tank-soil absorption field in problem soils, developing more efficient management techniques to on-site wastewater disposal systems, and assessing the implications of new wastewater disposal techniques for land use planning. Wastewater disposal systems not dependent on soil and site conditions, such as aerobic processes, intermittent granular filtration and evapotranspiration are discussed. Mound and underdrain systems are presented as alternative systems for problem soils. (SWF)

ACC# : L000898
AUTHOR: Brown, D.V., White, R.K.
AFFIL : N/A
TITLE : Septage Disposal Alternatives in Rural Areas
SOURCE: Ohio Agricultural Research and Development Center, U.S. 250 and Ohio 83 South, Wooster, Ohio, Research Bulletin 1096; or Cooperative Extension Service, The Ohio State Univ., Extension Bulletin 624 (10 pages)
YEAR : 1977
TEXT : This project in two southern Ohio counties considered available rural septage disposal alternatives. Methods selected for handling one million gallons annually were: (1) three parallel storage basins for three-year holding capacity prior to land spreading, (2) lime stabilization prior to land spreading, and (3) discharge into a sewage treatment plant. Storage basins offer the simplest technology, management and the lowest cost. Lime treatment can be helpful in areas with lime-deficient soils. Where soils are unsuited for infiltration, treatment plant disposal may be the only alternative. (SWF)

ACC# : L000899
AUTHOR: Sharpe, W.E.
AFFIL : School of Forest Resources and the Institute for Research on Land and Water Resources, Pennsylvania State University, University Park, PA 16802
TITLE : Water Conservation Devices for New or Existing Dwellings
SOURCE: Journal American Water Works Association, 73(3):144-149 (6 pages)
YEAR : 1973
TEXT : Discussion of individual home water conservation with emphasis on toilet and shower devices. Results are given on water reduction efficiency, tests of toilet devices, and flow rate comparisons of shower devices made by the California Department of Water Resources. General cost information and performance criteria are given for toilet and shower devices. Briefly mentioned in connection with in-dwelling conservation devices are water-saving toilets, automatic washing machines, faucet devices, leak detection tablets, pressure-reducing valves and spray taps. Specific conservation device operational parameters are recommended. (SWF)

ACC# : L000900
AUTHOR: Schmidt, C.J.
AFFIL : SCS Engineers, Long Beach, California
TITLE : Rural Wastewater Management in California
SOURCE: The California Water Resources Control Board, Sacramento, CA (53 pages)
TEXT : Water management in the home, household wastewater and rural wastewater problems are discussed in this guidance manual. On-site systems and centralized sewer alternatives are explained with regard to advantages, disadvantages and cost considerations. Remedies for failing systems and management of on-site systems are also discussed. (SWF)

ACC# : L000901
AUTHOR: McCoy, E., Ziebell, W. A.
AFFIL : Civil Engineering, University of Wisconsin, Madison, Wisconsin
TITLE : The Effects of Effluents on Groundwater: Bacteriological Aspects
SOURCE: Proceedings of the Second National Conference, Individual On-site Wastewater Systems, 1975: 67-80 (14 pages)
YEAR : 1975
TEXT : Discusses bacterial content of sewage and mechanisms of soil treatment for bacterial removal. Presents data on bacteria removal through soil columns. Data includes variations in removal at different depths and over a period of time with a discussion of factors which influence soil treatment. (SWF)

ACC# : L000902
AUTHOR: N/A
AFFIL : N/A
TITLE : Wyoming Requires Financial Analysis in Step 1 of Facilities Planning
SOURCE: Environmental Finance, 1(2):5 (1 page)
YEAR : 1981
TEXT : Describes the State of Wyoming's requirements for 201 grantees to meet specific financial planning forecasts during Step 1 of the facilities planning process. A test case using these new financial planning procedures conducted in the Mills-Casper-Evansdale area is cited and recommended to serve as an example for other agencies contemplating similar 201 program involvement. A contact person and location is given for more information on the subject. (SWF)

ACC# : L000903
AUTHOR: Goldstein, N.
AFFIL : N/A
TITLE : The Prime Movers of Sludge
SOURCE: BioCycle, 22(2):24-27 (4 pages)
YEAR : 1981
TEXT : Because of federal regulations, the aspects of land application of municipal and industrial sludges has changed dramatically. This has led to a bigger market for sludge handling companies. Four major sludge handlers, Ny-Trex, Inc.; BioGro Systems, Inc.; Modern Earthlines, Inc.; and Ad+Soil Systems, were surveyed. Each company handles only non-toxic sludges and also provides a turnkey service: supervising and carrying out the physical aspects of pumping, transporting, land applying, and completing the technical, scientific and bureaucratic aspects of applying for permits, holding public meetings, monitoring the applications and testing on a regular basis. It is also pointed out that though farmers are very happy with increased production due to sludge aplication on their farms, the public is still concerned with health aspects. Conclusions indicate that though each company sells land application services, each is a little different in both operation and attitude and that the future no doubt holds an increase in new sludge handling companies to meet the market demand. (SWF)

ACC# : L000904
AUTHOR: Bishop, P. L., Logsdon, H.
AFFIL : Civil Engineering, University of New Hampshire and Rural Community Assistance Program Project Director, Rockingham County Community Action Program
TITLE : Rejuvenation of Failed Soil Absorption Systems
SOURCE: ASCE, 107 (EEI): 47-55 (9 pages)
YEAR : 1980
TEXT : The use of hydrogen peroxide has been shown to be an effective method for rejuvenating soil absorption systems, particularly those with sandy loam or loamy sand soils, which have failed because of crust or organic mat buildup. According to available data, the amount of hydrogen peroxide required appears to be dependent on the soil type and the thickness of the crust. Sandy soils require lower hydrogen peroxide loading rates for rejuvenation than silty soils. Data on concentrations and loading rates of hydrogen peroxide required to rejuvenate different soils are given. It should be noted that small-diameter columns were used in these studies. Field results could differ because of difficulties in evenly distributing the hydrogen peroxide over the mat. More field experimentation will be required before actual recommended loading rates can be presented. (SWF)

ACC# : L000905
AUTHOR: N/A
AFFIL : New England River Basins Commission
TITLE : Demand Management Programs
SOURCE: Before the Well Runs Dry - A Handbook for Designing a Local Water Conservation Plan: 84-89 (6 pages)
YEAR : 1981
TEXT : Disusses demand management programs to reduce overall community water use and describes possible water savings from water-saving fixtures, reuse/recycle systems and user habit changes. To illustrate the total water use reduction possible, a hypothetical town is cited along with the conservation programs used to achieve water savings. Tables summarize water reduction techniques used and their cost for the town, along with the water and money saved. (SWF)

ACC# : L000906
AUTHOR: Glasgow, D.
AFFIL : County Sanitation Districts of Los Angeles County, California
TITLE : Pressure Sewer Systems

SOURCE: WATER/Engineering & Management, 128(6):68-70 (3 pages)
YEAR : 1981
TEXT : A thorough description of two major pressure sewer systems (grinder pump and septic tank effluent pump) are given. General system applications, typical design flows and design considerations, layout patterns for pressure sewer systems, and a simple schematic of possible pipe layouts are included. (SWF)

ACC# : L000907
AUTHOR: N/A
AFFIL : N/A
TITLE : Treatment R & D
SOURCE: AWWA Research Foundation - Municipal Wastewater Reuse News, No. 4:4-7 (4 pages)
YEAR : 1981
TEXT : Discusses a single- or multiple-dwelling application of wastewater treatment via water hyacinths. Studied by National Aeronautics and Space Administration (NASA), the system is capable of purifying water for sub-potable applications. Solids removed prior to the hyacinth troughs, along with the mass of hyacinths gained through growth, could be used in an anaerobic digestion process to produce both methane to heat the facility in the winter and organic fertilizer. (SWF)

ACC# : L000908
AUTHOR: Hrudey, S.E.
AFFIL : University of Alberta, Edmonton, Canada
TITLE : Water Reclamation and Reuse
SOURCE: Journal Water Pollution Control Federation, 53(6):751-767 (16 pages)
YEAR : 1981
TEXT : A complete literature review on water reclamation and reuse is given. The following subjects are referenced: water resources planning, agriculture and irrigation, groundwater recharge, industrial water resue, domestic reuse, health considerations, and new and improved technology developments. (SWF)

ACC# : L000909
AUTHOR: Morgan, J.M., Huffman, G.L., Green, T., Judkins, J.F.
AFFIL : N/A
TITLE : Hydraulics of Intermittent Sand Filters Loaded with Single-Cell Oxidation Pond Effluent
SOURCE: Journal of Water Pollution Control Federation, 53(5):587-593 (7 pages)
YEAR : 1981
TEXT : Because of the use of single-cell oxidation ponds in the United States and the inability of these facilities to meet the definitions of secondary treatment as set forth by the U.S. EPA, a study of intermittent sand filters as a viable alternative to help reach these effluent standards was conducted. The application of single-cell oxidation pond effluent to intermittent sand filters of differing sand sizes and loading rates over an extended testing period yielded these findings: 1) suspended solids removal efficiencies on the order of 30-70 percent,
2) hydraulic performance of the filters is highly variable and related to sand size, hydraulic loading rate, weather conditions and suspended solids loadings, and 3) currently available mathematical methods for estimating length of filter runs are generally inadequate for design purposes. (SWF)

ACC# : L000910
AUTHOR: N/A
AFFIL : N/A
TITLE : Governmental Leasing: Three Municipalities Select An Alternative to Purchase with Bond Financing
SOURCE: Environmental Finance, 1(2):3-4 (2 pages)
YEAR : 1981
TEXT : A straight operating lease and a lease-purchase agreement, as opposed to the traditional bond issue, may be a more feasible method of acquiring capital facilities or major wastewater treatment equipment. The article cites three successful applications of lease-purchase agreements in wastewater treatment facilities. Lease-purchase equipment has the advantage of demonstrating its performance prior to actual purchase. (SWF)

ACC# : L000911
AUTHOR: Winneberger, J.H.T., Mellen, W.L., Matthew, F.L.
AFFIL : Hancor Engineers
TITLE : On-site Waste Management, Vol. VIII - The Maintenance and Management of On-Site Waste Management Systems
SOURCE: Hancor, Inc., Findley, Ohio 45840

YEAR : 1980
TEXT : Warranties and required maintenance programs for on-site septic tank wastewater disposal systems are discussed in this three-report volume. Titles include "Maintenance by Private Industry of On-Site Wastewater Disposal Systems", by J.T. Winneberger; "The Septic Systems, A Guide for Homeowners", by William L. Mellen; and "A Simple Formula for Successful Wastewater Systems", by Floyd L. Matthews. (SWF)

ACC# : L000912
AUTHOR: Young, C.E., Epp, D.J., editors
AFFIL : Pennsylvania State University, Institute for Research on Land and Water Resources
TITLE : Wastewater Management in Rural Communities: A Socio-Economic Perspective
SOURCE: Information Report 103, Institute for Research on Land and Water Resources, Pennsylvania State University, University Park, Pennsylvania
YEAR : 1979
TEXT : The status of economic knowledge of wastewater treatment, particularly land application, is assessed in a collection of seven papers. Topics addressed include: alternatives for wastewater treatment, land treatment of wastewater, legal issues associated with land application, land treatment of sludge, public acceptance of land application, charge systems for industrial wastes, and comprehensive planning under Section 208 of P.L. 92-500. Four themes underlie the discussions. Wastewater management will be costly to rural communities. Land application of wastewater and sludge is a good alternative for treatment and disposal of wastes. It is desirable to jointly treat industrial wastes when compatible and to charge organizations the full cost of treating their wastes. Finally, the subsidy program provided by P.L. 92-500 may discourage the development of economically efficient wastewater treatment systems. (AU)

ACC# : L000913
AUTHOR: Rezek, J.W., Cooper, I.A.
AFFIL : Rezek, Henry, Meisenheimer and Gende, Inc., Libertyville, IL 60048
TITLE : Septage Mangement
SOURCE: Municipal Environmental Research Laboratory Report EPA-600/8-80-032, U.S. Environmental Protection Agency, Cincinnati, OH 45268 (132 pages)
YEAR : 1980
TEXT : Report presents state-of-the-art information for implementing cost-effective and environmentally sound solutions for septage treatment and disposal. Current septage hauler practices, septage characterization and estimated hauler charges are presented. Design concepts from full-scale and pilot installations, along with capital and O & M costs, are presented on the following septage treatment and disposal methods: 1) land-based disposal including spray irrigation, ridge and furrow, land spreading, subsurface injection, burial, trenching, disposal lagoons, sanitary landfills, leaching lagoons, marsh/pond and meadow/marsh/pond; 2) separate septage treatment systems including aerated lagoons, anaerobic/aerobic processes, composting, pressure chlorination, RBC, wet air oxidation, autothermal aerobic digestion and chemical precipitation/stabilization; and 3) septage treatment at sewage treatment plants including receiving stations, primary treatment, activated sludge by slug addition, activated sludge by controlled addition, attached growth systems, aerobic digestion, anaerobic digestion, mechanical dewatering and sand bed drying. (SWF)

ACC# : L000914
AUTHOR: EPA
AFFIL : US-EPA, Office of Water Programs
TITLE : Alternative Wastewater Management Techniques for Best Practicable Waste Treatment
SOURCE: US-EPA, Report EPA-430/9-75-013, Office of Water Programs, Washington, DC 20460 October, 1975 (76 pages)
YEAR : 1975
TEXT : This publication provides the criteria for best practicable waste treatment. Waste management techniques for land application and land utilization are discussed. Management techniques for flow reduction, secondary and advanced treatment, storm and combined-sewer control and sludge handling are presented. Reuse of wastewater is also examined. Appendices include the bibliography, cost-effectiveness analysis guidelines, secondary treatment information and groundwater requirements. (SWF)

ACC# : L000915
AUTHOR: N/A
AFFIL : N/A
TITLE : Manual of Instruction for Package Plant Operators

SOURCE: West Virginia Department of Health, Division of Sanitary Engineering (22 pages)
YEAR : 1979
TEXT : This manual provides basic information necessary to properly operate and maintain a package plant. Most plants do not achieve the design removal of pollutants due to lack of operational and maintenance knowledge. This manual gives operators useful information in dealing with installation, pretreatment, chlorination, etc. (SWF)

ACC# : L000916
AUTHOR: Smith, R. K., Leffel, R. E.
TITLE : Small Town Opts for Pond Wastewater Treatment
AFFIL : Camp Dresser & McKee, Inc.
SOURCE: Water and Sewage Works, June 1978:72-74 (3 pages)
YEAR : 1978
TEXT : Pond wastewater treatment proved to be the most economical and easy to operate for the small town of Millinocket, Maine. The system consists of 13 acres of aerated and facultative ponds which provide the equivalent of secondary treatment via biological processes. Central to the treatment of the 2.3 MGD average flow are 282 static submerged air diffusers, each with 40 cfm capacity supplying aeration to three 4.3 acre (1.7 ha), 10 ft. (3 m) deep ponds. (SWF)

ACC# : L000917
AUTHOR: Brooks, J.L.
AFFIL : University of Maine, Orono, ME
TITLE : A Field Study of Sphagnum Peat for Treating Septic Tank Effluent
SOURCE: MS Thesis in Resource Utilization, University of Maine, Orono, ME (154 pages)
YEAR : 1980
TEXT : A field study on the use of sphagnum peat for on-site domestic wastewater treatment in areas where existing soils are unacceptable. The system was monitored on an average of twice a month for one year for various chemical and bacterial concentrations to determine the degree of treatment obtained in this experimental field. Sample test showed no fecal coliform indicator organisms present in the effluent, and nitrogen was reduced to less than detectable levels. Phosphorus levels were also reduced and continued to decrease as the field "aged." The field maintained an aerobic state throughout the study. Results indicate that sphagnum peat is an efficient medium for the removal of pollutants from residential wastewater. (AU)

ACC# : L000918
AUTHOR: Cliver, D., Green, K.M., Bouma, J.
AFFIL : University of Wisconsin-Madison
TITLE : Viruses and Septic Tank Effluent
SOURCE: University of Wisconsin-Madison(15 pages)
YEAR : 1975
TEXT : Soil is pictorially described at a grade school level. Emphasis is placed on sources of viruses and their removal through soil treatment systems. Data collected from research on sand filters is used to demonstrate the significance of dosing systems and unsaturated flow in soil or sand filters for removal of viruses in septic effluent. (SWF)

ACC# : L000919
AUTHOR: N/A
AFFIL : Whitman and Howard, Inc., Engineers and Architects, Wellesley, Massachusetts
TITLE : A Study of Waste Septic Tank Sludge Disposal
SOURCE: Division of Water Pollution Control, Water Resources Commission, The Commonwealth of Massachusetts (112 pages)
YEAR : 1976
TEXT : Three areas of septage disposal: sand disposal, combined treatment with municipal wastewater, and separate treatment are studied and evaluated on the basis of engineering practice and current research in each area. Topics discussed are a) problems of septage disposal, b) characteristics and quantities of septage c) septage disposal - state-of-the-art and, d) septage research and treatability studies. Conclusions state that the area of combined treatment of septage with wastewater warrant the greatest need for study, through the remaining areas of septage disposal, separate treatment and land disposal are in need of additional development (SWF)

ACC# : L000920
AUTHOR: Sauer, D.K.
AFFIL : University of Wisconsin-Madison
TITLE : Dry Feed Chlorination of Wastewater Onsite
SOURCE: University of Wisconsin-Madison (16 pages)

YEAR : 1975
TEXT : Disinfection of on-site wastewater, via dry feed chlorination of sand filter effluent is described in this research report. Evaluation of the chlorination unit was based upon the following criteria: 1) disinfection performance, 2) hypochlorite tablets, and 3) maintenance requirements. The author concluded that: a) adequate disinfection of sand filter effluent was attained by chlorination; b) residual chlorine after 4.5 to 8 hours contact time ranged from 0.1 to 1 mg/l; c) chlorine uptake rate for the aerobic unit-sand filter was 0.6 to 0.9 tablets/1000 gal (with a flow of 100-150 gpd); d) chlorination cost 15 to 54 dollars per year (with a flow of 100 to 280 gpd); e) maintenance was required; and f) dry feed chlorination problems included the lack of control of hypochlorite dose to the wastewater. (SWF)

ACC# : L000921
AUTHOR: Denning, J.L., Bouma, J., Falayi, O., Van Rooyen, D.J.,
AFFIL : University of Wisconsin-Madison
TITLE : Calculation of Hydraulic Conductivities of Horizons in Some Major Soils in Wisconsin
SOURCE: Geoderma, 11:1-16 (16 pages)
YEAR : 1974
TEXT : Hydraulic conductivity between saturation and a tension of 100 cm water was calculated with moisture-retention data for nine soil horizons and compared with results from in-situ measurements with the crust test. Agreement was good for sandy, apedal soil horizons with simple packing voids but only if matching factors were used. Results were unreliable in clayey, pedal soil horizons in which a few relatively large planar and tubular pores determine K in the measured tension range, whereas the greatest fraction of total porosity is composed of fine pores inside peds that hardly contribute to flow. Varying the number of pore classes (n) and the water-filled porosity at saturation made no significant difference in the calculations for the special soils, but drastically changed the shape of the calculated curves for the pedal soils. Matching factors based on hydraulic conductivity measurement had to be used for all studied soil horizons, indicating that Marshall's pore-interaction model never predicted hydraulic conductivity accurately. (AU)

ACC# : L000922
AUTHOR: Lance, J.C., Gerba, C.P.
AFFIL : U.S. Water Conservation Laboratory, Phoenix, Arizona, and Baylor College of Medicine, Houston, Texas, respectively
TITLE : Poliovirus Movement During High Rate Land Filtration of Sewage Water
SOURCE: Journal of Environmental Quality, 9(1):31-34 (4 pages)
YEAR : 1980
TEXT : Research with soil columns that are good models of a field groundwater recharge system showed that most polioviruses are held near the soil surface. Secondary sewage effluent seeded with poliovirus type 1 (LSc) was filtered through 250-cm columns packed with calcareous sand from an area in the Salt River bed that is used for groundwater recharging of secondary sewage effluent. When the concentration of poliovirus added to the sewage water was increased from 90 to 86,000 PFU/ml, the number of viruses detected at each soil depth increased with the increasing virus concentration in the sewage water. Increasing the flow rate from 0.6 to 1.2m/day caused a virus breakthrough of greater than one percent of the added virus. However, 99 percent of the viruses still were removed from the infiltrating water at flow rates as high as 12m/day. The velocity of water movement through the soil may be the single most important factor affecting the depth of virus penetration. (AU)

ACC# : L000923
AUTHOR: N/A
AFFIL : Missouri Department of Natural Resources and Missouri Department of Health
TITLE : Missouri Homeowners Guide to Septic Tank Use
SOURCE: Missouri Department of Natural Resources (12 pages)
YEAR : 1979
TEXT : This Missouri homeowners guide provides answers to the question: "Is the septic tank sewage disposal system the best answer to my needs?" Topics include: state statutes and regulations, geological conditions, soil type, soil surveys and septic tank maintenance. Suggested septic tank alternatives include composting toilets, lagoons, aerated tanks and soil mounds. (SWF)

ACC# : L000924
AUTHOR: Raman, V.
AFFIL : Indian Water Pollution Control Association Newsletter
TITLE : Water Hyacinth - Foe or Friend?
SOURCE: Highlights, 17 (12): (1 page)

YEAR : December 1980
TEXT : The water hyacinth, a persistent aquatic weed in temperate areas of the world, has been recently used as a viable method for wastewater treatment. Water hyacinths efficiently remove organic materials, heavy metals, phosphorus and nitrogen present in wastewater. Experiments incorporating water hyacinths in existing faculative and secondary lagoons treating domestic wastewater yielded BOD removals of 70 to 90 percent. Suspended solids removal of 60 to 90 percent are also achieved. Construction and maintenance of the system is economical and requires minimal energy input. The system is applicable to developing countries where environmental conditions are favorable. (SWF)

ACC# : L000925
AUTHOR: Dinge, W.R
AFFIL : Texas Department of Health Resources
TITLE : Who Says Sewage Treatment Plants Have to be Ugly?
SOURCE: Water and Wastes Engineering, 13(9):20-23 (4 pages)
YEAR : 1976
TEXT : A pilot wastewater treatment system, incorporating aquatic plants and animals, was established in Austin, Texas, to treat stabilization pond effluent. The four-pond unit consists of water hyacinths and several fish species which remove suspended and dissolved substances, algae, bacteria and chemical compounds. Effluent from the pilot pond system contained low total nitrogen, heavy metals and fecal coliforms. This inexpensive filtration system is applicable to small communities utilizing lagoons for wastewater treatment. (SWF)

ACC# : L000926
AUTHOR: Dodd, J.C., Anderson, J.L.
AFFIL : Brown and Caldwell, Walnut Creek, CA, and Caldwell Connell Engineers, Melbourne, Australia
TITLE : An Integrated High Rate Pond-Algae Harvesting System
SOURCE: Progress in Water Technology, 9(3):713-726 (18 pages)
YEAR : 1977
TEXT : A high rate pond-algae harvesting system is proposed, and is compared with a conventional secondary treatment-nutrient removal system. Experimental work supported by the Department of Environment of the Australian Government was conducted by Caldwell Connell Engineers using a 0.28 ha high rate pond and pilot algae harvesting machine of the paper precoated belt filter type. The algae are separated from the precoat and dewatered to yield a high protein concentrate for livestock or fowl, and the precoat is recycled to provide a fresh filter medium. Comparative economic evaluation of the proposed and conventional systems indicate about the same total annual cost including capital recovery. When benefits from sale of the algal product are included, net annual costs of the proposed system are about three-fourths of the conventional system. Non-economic benefits of the proposed system include better resource utilization and lower total energy inputs and environmental impacts when alternative protein production is considered. (AU)

ACC# : L000927
AUTHOR: Goldman, J.C.
AFFIL : Woods Hole Oceanographic Institution, Woods Hole, MA 02543
TITLE : Outdoor Algal Mass Cultures - II Photosynthetic Yield Limitations
SOURCE: Water Research 13(1):119-136 (18 pages)
YEAR : 1979
TEXT : The photosynthetic conversion of sunlight energy into algal biomass in large-scale outdoor cultures is controlled by the availability of sunlight, the photosynthetic machinery of algae, nutrients, temperature and the design characteristics of the culture system. For the situation in which light is made the growth rate limiting factor, there is an upper limit in the light conversion efficiency of a large-scale culture. In practice, the best yield data for outdoor cultures in various locations in the world has been less. The development of large-scale mass cultures involves many considerations, but the two major design parameters for optimizing yields at a particular time of year are the flow rate through the culture and the depth. (AU)

ACC# : L000928
AUTHOR: Oron, G., Shelef, G., Levi, A., Meydan, A., Azov, Y.
AFFIL : Ben Gurion University of the Negev, Sde Boker, Israel and Environmental and Water Resource Engineering, Technion, Haifa, Israel
TITLE : Algae/Bacteria Ratio in High Rate Ponds Used for Waste Treatment
SOURCE: Applied and Environmental Microbiology, 38(4):570-576 (7 pages)
YEAR : 1979
TEXT : Field studies were conducted at Technion in Israel to determine the algae/bacteria ratio in high-rate algae ponds used for raw wastewater treatment. Results show that an algae/bacteria ratio of 1:100 or larger in the high-rate algae ponds insures adequate carbon dioxide

concentrations for algae utilization. The authors suggest the algae/bacteria ratio as a pond operation criterion and guideline for changes required to increase algal growth and improve effluent quality. A mathematical kinetic model for the high-rate algae pond be included. (SWF)

ACC# : L000929
AUTHOR: Howard, J., Lloyd, B.
AFFIL : Oxfam, Oxford and University of Surrey, respectively, UK
TITLE : Sanitation and Disease in Bangladesh Urban Slums and Refugee Camps
SOURCE: Progressive Water Technology, 2(1/2):191-200 (10 pages)
YEAR : 1978
TEXT : The present use of sanitation systems in Bangladesh is poor due to inadequate maintenance and social indifference. A three-year period of research and development was undertaken by Oxfam to develop a package sanitation and sewage treatment unit. The unit consists of a 500 kg wooden crate, 2m x 2m x 1m in size. Fiberglass squatting plates are arranged in parallel rows of 10. Each row is connected to a 20 litre capacity flushing tank. Sewage is flushed into two treatment tanks for treatment by sedimentation and anaerobic digestion. Effluent disposal is via a percolating filter. More than 70 Oxfam sanitation units are now installed in Bangladesh, serving a population of 70,000. On-site construction, maintenance, usage, acceptability and pathogen removal are discussed, along with future plans for utilization of the sanitation units. (SWF)

ACC# : L000930
AUTHOR: Viraraghaven, T., Landine, R.C., Winchester, E.L.
AFFIL : ADI Limited, Fiedericton, New Brunswick
TITLE : Oxidation Ditch Plus Alum Take Phosphorus Away
SOURCE: Water and Sewage Works, 126(10):54-56 (3 pages)
YEAR : 1979
TEXT : Discusses results of an Ontario, Canada, study that demonstrated the feasibility of phosphorous removal in an oxidation ditch treatment plant using alum or ferric chloride. Oxidation ditch is a form of extended aeration. Data provided for percent removal efficiency comparison include B.O.D., C.O.D., T.O.C., S.S., TKN and total phosphates (as P). Other specific topics include: a) design criteria for every phase of the plant from bar screen to alum storage; b) chemical choice; c) performance; and d) cost ($ 0.9 million). (SWF)

ACC# : L000931
AUTHOR: Simpson, M.H.
AFFIL : Technical Editor, The Journal of Environmental Sciences
TITLE : Effectiveness of Onsite Biogas Digesters and Sanitizing of Fecal Waste in Developing Countries - Part 1
SOURCE: The Journal of Environmental Sciences, March/April 1979:29-32 (4 pages)
YEAR : 1979
TEXT : The use of anaerobic digesters for converting rural wastes into biogas and fertilizer in developing countries was examined. Biogas production is a two-step process utilizing acid- and methane-forming bacteria. The efficiency of the process is dependent upon the maintenance of control parameters involving temperature, pH, retention time and the addition of nutrients. (SWF)

ACC# : L000932
AUTHOR: Yip, S.W., Wong, M.H.
AFFIL : The Chinese University of Hong Kong
TITLE : The Effect of Sewage Sludge on the Growth Rate of Carp, "Cyprinus carpio L."
SOURCE: Environmental Pollution, 14(2):127-132 (6 pages)
YEAR : 1977
TEXT : A sewage effluent and different concentrations of digested sludge ranging from 0 to 0.8 percent in tap water were used for raising carp. The highest growth rate of carp occurred in the 0.2 percent sludge, followed by the sewage effluent and 0 percent, 0.4 percent, 0.6 percent and 0.8 percent media. Similar results were obtained from measurements of the dry weights and protein contents of the carp at the end of the experiment.

The higher metal contents in the 0.4 percent, 0.6 percent and 0.8 percent media possibly accounted for the death and unhealthy appearance of fish reared in these media.

It is urged that the amount of sludge be estimated accurately before it is disposed into fish ponds. The uptake of heavy metals and other persistent materials by fish should also be investigated. (AU)

ACC# : L000933
AUTHOR: Spohn, I.E.

AFFIL : Composting Consultant, Heidelburg, Germany
TITLE : Determination of Compost Maturity
SOURCE: Compost Science/Land Utilization, 19(3):26-27 (2 pages)
YEAR : 1978
TEXT : A do-it-yourself chemical test can determine when composting material has reached maturity. This information can help permit the most efficient use of land and equipment, determine when composted material is ready for agricultural use and evaluate a promoter's claims. (SWF)

ACC# : L000934
AUTHOR: Balmer, P., Vik, B.
AFFIL : Norwegian Institute for Water Research, Norway
TITLE : Domestic Wastewater Treatment with Oxidation Ponds in Combinaton with Chemical Precipitation
SOURCE: Progressive Water Technology, 10(5/6):867-880 (13 pages)
YEAR : 1978
TEXT : The article discusses domestic wastewater treatment by chemical precipitation with oxidation ponds in pilot plant and full-scale treatment plants. Coagulent used in the pilot plant is alum. The study evaluates Norwegian winter and summer comparisons of chemical precipitation. Phosphorous, nitrogen, suspended solids, and C.O.D. removal charts are provided. Experiences with full-scale ponds are discussed and removal data are provided. (SWF)

ACC# : L000935
AUTHOR: Cook, M.B., Smith, H.
AFFIL : EPA Office of Water Program Operations
TITLE : An Alternative: Small Systems for Small Communities
SOURCE: Clearwaters - New York Water Pollution Control Association, 7(2): 14-15 (2 pages)
YEAR : 1977
TEXT : A representative from EPA's Office of Water Program Operations gives statistics on funding allocations from wastewater treatment in both large and small communities. He emphasizes that small communities have suffered economic hardship because of inadequate consideration of alternative collection and treatment systems. A case in point is given of how Cuyler, New York, joined together with Cortland County to install a community grinder pump/leachfield system which served forty homes. The project was funded through both a grant and a low interest loan from FmHA. Cost of the project was $150,000 with the town taking responsibility for all O & M following construction. (SWF)

ACC# : L000936
AUTHOR: Grunnet, K., Olesen, S.E.
AFFIL : Institute of Hygiene, University of Aarhus, DK-8000 Aarhus C, Denmark and Danish Land Development Service, DK-8800, Uiborg, Denmark
TITLE : Disappearance of Microorganisms by Infiltration and Percolation of Sewage
SOURCE: Progress in Water Technology, 2(4/5):473-481 (9 pages)
YEAR : 1979
TEXT : Discusses a study of a Danish town of 1500 person-equivalents which used an infiltration basin for wastewater treatment. Results showed that indicator bacteria and viruses were completely removed after infiltration and percolation through 20 m of sand. At a vertical depth of 10 m from the bottom of the infiltration basin, the microbial quality of water just met drinking water standards. The greatest removal of bacteria occurred in the first meter of unsaturated flow. (SWF)

ACC# : L000937
AUTHOR: Schutt, K., Converse, J.C., Vala, D., Otis, R.J.
AFFIL : The Wisconsin Geological and Natural History Survey, Wisconsin Department of Natural Resources and Environmental Protection Agency
TITLE : Locating and Landscaping the Mound System of On-Site Wastewater Disposal
SOURCE: Small Scale Waste Management Project, University of Wisconsin-Madison (12 pages)
YEAR : 1978
TEXT : This publication introduces the possibilities of the mound system as a landform design element. Topics include: a) site requirements, b) landscape options, c) design checklist, d) functional analysis-bubble diagram, e) landform, vegetation and design, f) plant selection and g) total organization. (SWF)

ACC# : L000938
AUTHOR: Anderson, J.L., Bouma, J.
AFFIL : University of Wisconsin; Soil Science Institute, Wageningen, The Netherlands
TITLE : Water Movement Through Pedal Soils I) Saturated Flow II) Unsaturated

Flow
SOURCE: Soils Science Society of America Journal, 41:413-423 (11 pages)
YEAR : 1977
TEXT : Demonstrates the potential usefulness of routine soil structure descriptions as a correlative tool for predicting certain aspects of physical behavior. Provided are two separate articles that study water movement through pedal soil with saturated and unsaturated flow conditions. All soils have a silty clay texture. Five medium subangular blocky structures were compared with five prismatic structures. Application of an unlimited quantity of traced water to drained columns resulted in very high dispersion, particularly for subangular blocky structures. Breakthrough curves for different flows are provided. (AU/SWF)

ACC# : L000939
AUTHOR: Sauer, D.K.
AFFIL : University of Wisconsin-Madison
TITLE : Surface Discharge Treatment System Using Intermittent Sand Filters
SOURCE: University of Wisconsin-Madison (15 pages)
YEAR : 1973
TEXT : A wastewater system with primary treatment, via septic tank or aerobic treatment, and secondary treatment, via intermittent sand filters and disinfection, is discussed in this report. The author summarizes the engineering technology of this surface discharge disposal system and also recommends the direction of future research in the development of this alternative. Diagrams for intermittent sand filtration systems are provided. (SWF)

ACC# : L000940
AUTHOR: Barshied, R.D., El-Baroudi, H.M.
AFFIL : Rensselaer Polytechnic Institute, Troy, N.Y.
TITLE : Physical-Chemical Treatment of Septic Tank Effluent
SOURCE: Journal Water Pollution Control Federation, 46(10):23, 47-54 (8 pages)
YEAR : 1974
TEXT : Discusses the physical-chemical treatment of septic tank effluent for phosphorous control and septic tank effluent characteristics. Chemical coagulants used in the physical-chemical system include lime, ferric chloride, ferric sulfate and alum. Coagulant dosage is discussed. Gravity settling and filtration with activated carbon were used for 50 percent COD removal. (SWF)

ACC# : L000941
AUTHOR: King, C
AFFIL : Pennsylvania Intergovernmental Council
TITLE : Water & Sewer - Resource Guide
SOURCE: Small Town Emphasis Program, P.O. Box 1288, Harrisburg, PA 17108 (58 pages)
YEAR : 1980
TEXT : The purpose of Small Town Emphasis Program is to enable Community Action Agencies and the leadership of small communities to undertake community facility projects. These can pertain to health care, water and sewer, transportation, housing, economics development, or energy which adversely effect low income residents of small communities. This guide contains a list of programs, agencies and organizations that could assist municipalities, community groups, and other parties to better utilize the technical and financial resources available to them. (SWF)

ACC# : L000942
AUTHOR: Moeller, J.R., Calkins, J.
AFFIL : Idaho Division of Environment, Pocatello and University of Kentucky, Lexington
TITLE : Bactericidal Agents in Wastewater Lagoons and Lagoon Design
SOURCE: Journal Water Pollution Control Federation, 52(10):2442-2451 (10 pages)
YEAR : 1980
TEXT : A study was conducted at the West Hickman Creek Wastewater Treatment Plant near Lexington, Kentucky, to determine the effect of solar ultraviolet light (UV) on coliform numbers in tertiary lagoons. Mean reduction of total and fecal coliforms ranged from 62.9 to 77.4 percent and from 66.7 to 70.0 percent, respectively, in three of the four lagoons. Effective coliform reduction was restricted to the top 30 cm. of each lagoon. The authors suggest the use of naturally occurring bactericidal agents - UV, temperature and wind action - to provide disinfection comparable to chlorine without the undesirbale effects of chlorine. A theoretical tertiary lagoon system to inhance UV killing is described. (SWF)

ACC# : L000943

AUTHOR: Reddy, K.R., Graetz, D. A.
AFFIL : University of Florida Agricultural Research and Education Center, Stanford, Florida
TITLE : Use of Shallow Reservoir and Flooded Organic Soil Systems for Waste Water Treatment: Nitrogen and Phosphorus Transformations
SOURCE: Journal of Environmental Quality, 10(1):113-119 (7 pages)
YEAR : 1981
TEXT : Use of a shallow reservoir (with a marly clay loam bottom) and flooded organic soil (Histosol) for inorganic nitrogen and phosphate removal from waste water (agricultural drainage effluent) was evaluated under simulated conditions. The results show that the shallow reservoirs and flooded organic soils could be effectively used for ammonium nitrogen and nitrate nitrogen removal from the waste waters. Aerating the floodwater resulted in rapid removal of nitrate nitrogen as a result of ultrifiltration and ammonia volatilization. Creating an anaerobic condition in the water column resulted in slower removal of nitrate nitrogen due to volatilization. Nitrate N removal was more rapid under anoxic water column conditions than with aerobic water column conditions. Rapid nitrification resulted in the initial increase in nitrogen nitrate levels in the water columns. Aerating the water column with carbon dioxide-free air resulted in rapid losses of ammonium nitrogen through volatilization. Aerating the water column with the air containing carbon dioxide resulted in a greater loss of ammonium nitrogen through nitrification than volatilization. A shorter residence time (1-6 days) of waste water over a soil column was required for effective removal of ammonium nitrate and a longer residence time of 12-24 days was required for effective removal of nitrate N from the water. For reservoir soil, about 70 and 76 percent of the floodwater P was removed under aerobic and anaerobic water column conditions, respectively. For flooded organic soil, 51 percent of the aerobic floodwater P was removed after two days of incubation, followed by an increase in soluble P concentration of the overlying water, whereas about 64 percent of the anaerobic floodwater P was removed during a 29-day incubation. (AU)

ACC# : L000944
AUTHOR: Teske, M. G.
AFFIL : Office of Environmental Health, Illinois Dept. of Public Health
TITLE : Recircultion - An Old Established Concept Solves Some Old Established Problems
SOURCE: 51st Annual Conference of the Water Pollution Control Federation (26 pages)
YEAR : 1978
TEXT : Paper defines the design, operation and maintenance for recirculating sand filters installed in Illinois. Detailed data on twelve units for BOD-5, suspended solids and ammonia nitrogen are presented. Detailed drawings of the total system and components are included. (SWF)

ACC# : L000945
AFFIL : N/A
TITLE : Alternative On-Site Waste Management-Systems, Marketplace, Manufacturers
SOURCE: Compost Science/Land Utilization, 20(2):18-26 (10 pages)
YEAR : 1979
TEXT : Classifies on-site toilet and sanitation systems into the main categories of biological, incinerating, aerobic and recirculating and gives a general description and application of each. Article discusses information available on sewerless sanitation and gives addresses for a number of sources. Potential markets are briefly described, followed by discussion of the emergence of distributors and service personnel necessary to support and maintain the systems. A manufacturers directory of inhouse systems is also given. (SWF)

ACC# : L000946
AUTHOR: Poduska, R. A., Anderson, B. D.
AFFIL : Tennessee Eastman Company
TITLE : Successful Storage Lagoon Odor Control
SOURCE: Journal WPCF, 53(3):299-310 (12 pages)
YEAR : 1981
TEXT : Reports the research procedures and results of full scale addition of sodium nitrate liquor to control odors in a sludge storage lagoon. Oxidation reduction potential was determined to be the best indicator for odor potential. Odor reduction potentials of greater than +250 mV were easily achieved with the addition of sodium nitrate liquor. Two benefits of denitrification include internal mixing by gas release and an increase in pH. (SWF)

ACC# : L000947
AUTHOR: Oluwande, P. A.

AFFIL : University of Ibadan, Nigeria
TITLE : The Merits and De-Merits of Package Sewage Treatment Plants in the Developing Countries
SOURCE: Water Pollution Control, Part 1 143-146 (4 pages)
YEAR : 1979
TEXT : The proper operation of package plants for sewage treatment in developing countries is dependent on factors of knowledgeable manpower and sufficient spare components. Unfortunately, these parameters are seldom met. Alternatives to package plants include oxidation ponds, aeration lagoons and oxidation ditches. Favorable environmental conditions, coupled with low cost and ease of maintenance, make these simple treatment methods practical for developing countries. (SWF)

ACC# : L000948
AUTHOR: Viraraghaven, T., Warnock, R. G.
AFFIL : Department of Civil Engineering, University of Ottawa, Ottawa, Canada
TITLE : Current Canadian Practice in Using Septic Tank Systems
SOURCE: Canadian Journal of Public Health, 66(3):213-220 (8 pages)
YEAR : 1975
TEXT : The use of septic tank-soil absorption systems in Canada is described, and a detailed survey of standards and regulation is presented. A tabular format with a brief narrative is used to compare the Canadian design criteria in each province with the recommendations set forth by Health and Welfare Canada and the United States Public Health Service. The design criteria consider quantity of waste generated, septic tank size and construction requirements, absorption field design, soil percolation limits and setback requirements. (SWF)

ACC# : L000949
AUTHOR: U.S. EPA
AFFIL : N/A
TITLE : Municipal Wastewater Treatment Works Construction Grants Program
SOURCE: Federal Register, Part III, September 27, 1978 (87 pages)
TEXT : The federal rules and regulations governing the construction grants program for municipal wastewater treatments works reflect the amendments to the Federal Water Pollution Control Act as contained in the Clean Water Act of 1977, which deals with technical, administrative and programmatic changes to facilitate administration of, and participation in, the program. Public participation programs and revision of the cost-effectiveness analysis guidelines are discussed. Half of the publication consists of a detailed discussion of all aspects of the regulations and their public review commentaries. (SWF)

ACC# : L000950
AUTHOR: Wolf, H. W., Sagik, B. P., Sorber, C. A.
AFFIL : N/A
TITLE : Land-Applied Effluents: Impact Water Resources
SOURCE: Water and Sewage Works, 126(3):66-67 (2 pages)
YEAR : 1979
TEXT : Discusses the possibility that virus and pathogenic bacteria contaminate groundwater through land application of sludge and wastewater. References a number of studies which evaluate the movement of viruses and pathogens on the soils. Risks of contamination decreased through adequate wastewater disinfection and proper selection for land disposal sites. (SWF)

ACC# : L000951
AUTHOR: Laak, R., McLean, D. M.
AFFIL : Civil Engineering, University of Toronto, Toronto 5, Ontario, and The Research Institute of the Hospital for Sick Children, Toronto, Ontario, Canada
TITLE : Virus Transfer Through a Sewage Disposal Unit
SOURCE: Canadian Journal of Public Health, 58(4):172-176 (5 pages)
YEAR : 1967
TEXT : Sabin poliovirus-3 infectivity was reduced relatively slowly by a continous flow total oxidation tank with the virus appearing in the effluent from the soil column five days after the virus dose was placed into the aeration tank.

Batches of aeration tank liquid which were aerated for six days showed no acceleration of inactivation of poliovirus-3. The slow decline of virus infectivity was attributed to the thermal degradation.

Soil columns constructed of medium sand, garden soil and sandy loam transferred recoverable poliovirus-3 until the initial fluorescein sodium dose was diluted to about one part in ten thousand for each type of soil. Virus titres declined mainly as a result of dilution.

Poliovirus-3 was recovered from sample cores in the sand columns two to five days after the infectivity of virus in the column effluents was undetectable. The decline of virus titre in the sand cores was attributed to thermal degradation and occassional washout. (AU)

ACC# : L000952
AUTHOR: Coolbroth, F. P.
AFFIL : Frank Coolbroth-Sitton Septic Tank Co., Plymouth, Minnesota
TITLE : The Sewage Osmosis Concept for Onsite Disposal Systems - Clay Soils
SOURCE: Individual Onsite Wastewater Systems - Proceedings of the Third National Conference, 1976, Ann Arbor Science Publishers, Inc., (4 pages)
YEAR : 1977
TEXT : Describes the concept of, and experiences with, the sewage osmosis leaching trench system in clay soils. Design requirements and cost figures for the Minneapolis and St. Paul, Minnesota, area are given. After installation of 50 systems, experience supports their use for failing system modification and for new systems on small, clay soil lots. (SWF)

ACC# : L000953
AUTHOR: Hines, M.
AFFIL : Illinois Dept. of Public Health, Springfield, Illinois
TITLE : Effluent Quality Considerations Affecting the Use of Sand Filters and Oxidation Lagoons
SOURCE: Individual Onsite Wastewater Systems - Proceedings of the Third National Conference, 1976, Ann Arbor Science Publishers, Inc., (5 pages)
YEAR : 1977
TEXT : Regional and national effluent standards may not adequately apply to small scale sewage treatment plants in rural areas. Since many of the small effluents discharge to intermittent streams, the requirements of effluent quality are even higher. This quality increases the cost of water treatment, yet as the author substantiates, it cannot be justified from the environmental and public health protection standpoint. The author suggests that effluent quality standards be adopted on a state wide or areawide basis and that more stringent local standards be adopted for those areas with high population density. (SWF)

ACC# : L000954
AUTHOR: Cross, F. L.
AFFIL : President, Frank Cross PE PA, Environmental Planning, Engineering and Management Services
TITLE : Land Application of Sludge
SOURCE: Pollution Engineering, 11(9):83-86 (4 pages)
YEAR : 1979
TEXT : The methods of land spreading of sludge, including regulations concerning these methods, advantages, and disadvantages are discussed. A table comparing sludge application devices is included. (SWF)

ACC# : L000955
AUTHOR: Averill, J.
AFFIL : National Center for Appropriate Technology, Washington, DC
TITLE : A Wood Frame Composting Toilet - Design Plans and Analysis of General Problem Areas
SOURCE: N/A
YEAR : 1979
TEXT : A composting toilet can be a logical low-cost disposal alternative in the steep terrain and small lots often encountered by low-income people of Appalachia. The study explains the general design considerations such as siting, proper sizing, cost factors and evaluation of different building materials. It sets performance criteria and discusses problems and solutions facing composting toilets, including insect control and the separate treatment of urine and greywater. The report concludes with a section on specific construction materials and procedures for an inexpensive wood-framed composting toilet. (SWF)

ACC# : L000956
AUTHOR: Jacobs, L. W., editor
AFFIL : Dept. of Crop and Soil Sciences, Michigan State University
TITLE : Utilizing Municipal Sewage Wastewater and Sludges on Land for Agricultural Production
SOURCE: North Central Regional Extension Publication No. 52 (75 pages)
YEAR : 1977
TEXT : A comprehensive view of how the north-central region of the United States uses sewage wastewaters and sludges on land for agricultural production. Eight chapters by university professors and extension personnel deal with the technical and non-technical aspects of land application. Chapters one and two discuss sewage sludges and wastewater characteristics and management. Chapters three, four, and five deal with site selection, land-use considerations, environmental quality standards, and health aspects. Chapters six, seven, and eight give a brief idea of the economic aspects, institutional options, and developing educational programs which explain the practicality and benefits of using these wastes on land. Each chapter ends with a list

of key references, and the bulletin ends with a detailed index. (SWF)

ACC# : L000957
AUTHOR: Carriker, R. R., Starr, A. L., editors
AFFIL : N/A
TITLE : Solvent Water/Wastewater Systems for Small Communities - Proceedings of a Conference
SOURCE: Food and Resource Economics Dept., Institution of Food and Agricultural Sciences, University of Florida; Florida Cooperative Extension Service, Center for Community and Rural Development, Institute of Food and Agricultural Sciences, University of Florida, (72 pages)
YEAR : 1980
TEXT : This Florida-oriented publication which emphasizes rural water supply contains papers concerning alternative institutional modes for supporting community water and sewer systems, financial assistance for water and sewer development, Orange County's (Florida) experiences in the acquisition of utilities, legal aspects of water/wastewater system finance and management, Florida's drinking water quality standards, and an overview of planning and management problems of small water and wastewater systems in Florida. Includes an appendix of information on community facility loans, and water and waste disposal loans and grants available through FmHA. Contains a bibliography of 160 entries pertaining to water/wastewater systems for small communities. (AU/SWF)

ACC# : L000958
AUTHOR: N/A
AFFIL : N/A
TITLE : Small Scale Sewage Treatment - A Swiss View
SOURCE: Water Services, October 1979, 83(1004): 787-788 (2 pages)
YEAR : 1979
TEXT : Biospiral units, which act much like RBC units, were developed in Switzerland for small flows treatment plants. The biospiral utilizes polyvinyl chloride or polystyrene discs that promote sewage treatment by attached growth organisms. A system description and cost of one such plant in Switzerland is included. (SWF)

ACC# : L000959
AUTHOR: McGauhey, P. H., Winneberger, J.H.T.
AFFIL : College of Engineering and School of Public Health, University of California at Berkeley
TITLE : A Study of Methods of Preventing Failure of Septic Tank Percolation Systems
SOURCE: Superintendent of Documents, U.S. Government Printing Office, Washington, DC, (33 pages)
YEAR : 1967
TEXT : Problems facing septic tank systems operation are identified and discussed. Percolation and infiltration capacity, factors affecting clogging of soil and clogging of leaching fields are thoroughly detailed. An approach to sizing the percolation system and recommendations to prevent or postpone failure through closing and resting systems is included. (SWF)

ACC# : L000960
AUTHOR: N/A
AFFIL : Department of Health and Social Sciences, Division of Health, Madison, Wisconsin
TITLE : Summary Report of a Survey of Private Sewage Disposal Systems Serving Water Front Properties
SOURCE: The State of Wisconsin (12 pages)
YEAR : 1967
TEXT : A survey of water front properties on eight lakes located throughout the State of Wisconsin by the Department of Health was conducted to relieve the misconceptions about the state septic tank law. The report shows the degree of compliance with the existing regulations, the extent of discharge of wastes into the ground and into surface waters, the effectiveness of the present program procedure and the basic causes of noncomplying installations. (SWF)

ACC# : L000961
AUTHOR: Tucker, L. S.
AFFIL : Urban Drainage and Flood Control District of Metropolitan Denver, CO
TITLE : Golfview Estates Overcomes Sewage Handicap
SOURCE: American Land, ALOA, Washington, DC, Summer 1972:22-26 (5 pages)
YEAR : 1972
TEXT : The soil conditions at Golfview Estates near Jeffersonville, Indiana, could not allow for septic tanks, and a gravity system would be too costly. A new alternative, the grinder pump system, could solve the

problem. Cost comparison involved a price per lot: 1) grinder pump and pressure sewage system, $1,500/lot; and 2) gravity system, $2,100/lot. Using a grinder pump solved the cost and the lift station problem (static lift of 45'). Five pressure sewage systems using proprietary Environment/One grinder pumps are currently in use, and fourteen are in the planning stage (as of 1972) across the nation. (SWF)

ACC# : L000962
AUTHOR: Blume, H. P., Horn, R., Alaily, F., Jayakody, A. N., Meshref, H.
AFFIL : Institut fur Okologie-Bodenkunde, Technische Universitat Berlin, Federal Republic of Germany
TITLE : Sand Cambisol Functioning as a Filter Through Long-Term Irrigation with Wastewater
SOURCE: Soil Science, 130(4):186-192 (7 pages)
YEAR : 1980
TEXT : Reports the results obtained from a two-year study on a sandy cambisol flooded with wastewater for eight years. The soil was compared to a forest soil of the same type. The treated soil showed a large increase in N, P, Cu, and Zn, possibly due to the increase in humus content and pH values caused by surface irrigation. The decrease in Mn and Fe levels were attributed to low oxidation potentials from flooding. Spray irrigation was prepared to raise the oxidation potential and to intensify the Fe, Mn, and P Levels. (SWF)

ACC# : L000963
AUTHOR: Basu, D.
AFFIL : Assistant Municipal Engineer, Special Products, Division District of Survey, British Columbia
TITLE : An In Depth Discussion of Vacuum Sewer Systems
SOURCE: British Columbia, Canada, (8 pages)
TEXT : Principles of a vacuum wastewater system are discussed. Conclusions included are: a) low construction cost for small diameter mains installed closer to ground surface; b) decreased infiltration and reduced treatment cost; c) Reduced water consumption; and d) ease of installation. An example is provided and a theory of design is included. (SWF)

ACC# : L000964
AUTHOR: Kropf, P. W., Laak, R., Healy, K. A.
AFFIL : University of Connecticut, Storrs
TITLE : Equilibrium Operation of Subsurface Absorption Systems
SOURCE; Journal Water Pollution Control Federation: 2007-2016 (10 pages)
YEAR : 1977
TEXT : This investigation examined the infiltration rate through the clogging mat of a soil absorption system and involved development of a design criteria for the construction of a system that would function at its equilibrium point, offering successful long-term operation. Soil column samples were tested under a constant hydraulic head and with/without a groundwater table within a few inches of the infiltration surface. The samples were flooded at different frequencies. Results showed that the infiltration rate is related to the prevailing gradient, but it is independent of the permeability of the supporting soil matrix. Continued inundation of the infiltrative surface for 80 weeks in an anaerobic environment did not affect the long term acceptance rate. (SWF)

ACC# : L000965
AUTHOR: Lloyd, R. C.
AFFIL : The Pennsylvania Intergovernmental Council
TITLE : Water & Sewer - Capacity Training Seminar Series
SOURCE: Small Town Emphasis Program, P.O. Box 1288, Harrisburg, PA
YEAR : 1980
TEXT : The Small Town Emphasis Program (STEP) is a grant program funded by the Mid-Atlantic Regional Office of the U.S. Community Services Administration (CSA). According to CSA, STEP is to provide assistance that will enhance the capabilities of grantees and subgrantees. In Pennsylvania, STEP offered a series of one-day capacity training seminars (June and July, 1980) designed to provide grantees with a knowledge of government programs and community resources by working with individuals familiar with their community and its problems. This paper reviews the major points from the June 18, 1980, presentation on identifying and solving community water and sewer problems. (SWF)

ACC# : L000966
AUTHOR: Baker, F. G.
AFFIL : University of Wisconsin - Soil Science Department, Madison
TITLE : Variability of Hydraulic Conductivity Within and Between Nine Wisconsin Soils

SOURCE: Water Resources Research, 14(1):103-108 (6 pages)
YEAR : 1973
TEXT : Hydraulic conductivity was measured in selected subsurface horizons of nine soil series by using the crust test method. Measurements were made for several moisture potentials at several randomly selected sizes per soil series. The morphological character of the soil series spanned a broad range, from sands to clay loam soils. The k characteristic of each series was mathematically described, and the series conductivity curves were related as a family of curves. By using multivariate discriminant analysis the series were grouped into classes of similar hydraulic behavior, based on the dispersion of moisture potential and hydraulic conductivity data within and between series. A 95 percent prediction interval was constructed to include the range of conductivities to be exected at future sites. (AU)

ACC# : L000967
AUTHOR: Machmeier, R. E.
AFFIL : Agricultural Extension Service, University of Minnesota
TITLE : Town and Country Sewage Treatment
SOURCE: Agricultural Extension Service, University of Minnesota, Extension Bulletin 304 (67 pages)
YEAR : 1977
TEXT : This agricultural extension bulletin contains comprehensive information on the proper design, installation, use and maintenance of on-site sewage treatment. It is intended primarily for homeowners, but contractors and installers, administrators of sanitary ordinances, consultants, and local, state and regional government officials will also find it useful. Major topics include: 1) sewage tanks, 2) soil treatment units, 3) pumping stations, 4) alternative systems, and 5) operation and maintenance. (SWF)

ACC# : L000968
AUTHOR: Lombardo, P.
AFFIL : DSI Environmental Engineers, Boston, Mass.
TITLE : Appropriate Wastewater Management Planning for Small Communities
SOURCE: Compost Science/Land Utilization, 20(6):16-19 (4 pages)
YEAR : 1979
TEXT : The article provides a method for selecting the best wastewater management system. States that a comprehensive 201 program for a small community will include: 1) community profile, 2) problem area definition, 3) alternative generation and selection, 4) environmental impact assessment, and 5) public participation. Each topic is discussed in detail and examples are provided. (SWF)

ACC# : L000969
AUTHOR: Wolverton, B. C., McDonald, R. C.
AFFIL : National Aeronautics and Space Administration, NSTL Station, Miss.
TITLE : Upgrading Facultative Wastewater Lagoons with Vascular Aquatic Plants
SOURCE: Journal Water Pollution Control Federation, 5(2):305-313 (9 pages)
YEAR : 1979
TEXT : The performance of a single-cell, facultative wastewater lagoon has been significantly improved with the introduction of vascular aquatic plants. Water hyacinth was the dominant plant from April to November; duckweed flourished from December to March. This 2-ha lagoon received approximately 475 cubic meter/day of untreated wastewater and had a 5-day biochemical oxygen demand loading rate of 22 to 30 kg/ha-d. During the first 14 months of operation with aquatic plants, average influent BOD-5 was reduced by 95 percent from 110 mg/1 to an average of 5 mg/1 in the effluent. The average influent suspended solids were reduced by 90 percent from 97 mg/1 to 10 mg/1 in the effluent. (AU)

ACC# : L000970
AUTHOR: Otis, R. J.
AFFIL : University of Wisconsin, Madison
TITLE : Alternative Wastewater Facility For A Small Unsewered Community
SOURCE: National Conference on Less Costly Wastewater Treatment Systems for Small Communities: 97-113 (17 pages)
YEAR : 1977
TEXT : Small-diameter gravity sewers discharging to a soil absorption field were found to be the most cost-effective alternative for Westboro, Wisconsin. Numerous figures detail the Westboro area and the alternative systems' locations. Costs for each alternative are provided. Financing of the selected system is also discussed. (SWF)

ACC# : L000971
AUTHOR: Wareham. A. E.
AFFIL : Environment Protection Authority of Victoria, Australia
TITLE : Comparison of Sewerage and Common Effluent Drainage for Country

Townships
SOURCE: Environment Protection Authority of Victoria, Report No: 65/79 (65 pages)
YEAR : 1979
TEXT : Common effluent drainage (CED) small-diameter effluent sewers were found to be a viable alternative to conventional sewerage systems in country townships of South Australia. Septic tank effluent was collected by reticulation drains and treated in a series of five lagoons. Cost-benefit analysis found the costs of the CED system to be 20-25 percent less than the costs for conventional sewerage systems. (SWF)

ACC# : L000972
AUTHOR: Ehlert, N.
AFFIL : Applied Science Section, Ontario Ministry of the Environment
TITLE : Spray Runoff Disposal of Waste Stabilization Pond Effluent
SOURCE: Environment Canada, Research Report No. 22 (30 pages)
YEAR : 1975
TEXT : Effluent from the Smithville municipal waste stabilization pond has been sprayed on a sloping (5 percent) area of soil with a permeability, k, less than or equal to 0.14 in/hr for two seasons. Results indicate that a combined pond and spray runoff disposal of sewage effluent appears to be a feasible means of upgrading effluent quality, provided erosion and/or damage to vegetation does not occur. (AU)

ACC# : L000973
AUTHOR: Schauffler, F. K.
AFFIL : New England Interstate Water Pollution Control Commission (NEIWPCC)
TITLE : Guidelines for Septage Handling and Disposal
SOURCE: New England Interstate Water Pollution Control Commission (37 pages)
YEAR : 1978
TEXT : This booklet is intended to serve as a technical guidelines manual to assist New England residents with the control and abatement of pollution attributable to the handling and disposal of septage. Septage characterization, collection, and transport are discussed along with the equipment and procedures needed to collect and transport it. Methods for treatment and disposal of septage include direct land disposal, disposal of wastewater treatment plants, and disposal of special facilities. In addition, legislation and regulation considerations for handling and disposing of septage are also mentioned. (SWF)

ACC# : L000974
AUTHOR: Chen, R. L., Patrick, W. H.
AFFIL : Center for Wetland Resources Louisiana State University
TITLE : Efficiency of Nitrogen Removal in a Simulated Overland Flow Waste Water Treatment System
SOURCE: Journal Environmental Quality, 10(1):98-103 (6 pages)
YEAR : 1981
TEXT : Preliminary results indicate that overland flow treatment can effectively remove nitrogen from wastewater. This study concentrated on the quantitative aspects of microbial conversion of ammonium nitrogen to various forms in a plant-soil system under periodic flooded conditions. The laboratory study was conducted by applying labeled nitrogen to scale models of plant-soil systems to determine the fate of wastewater nitrogen applied to an overland flow system. Perennial ryegrass was used as a cover crop. Results showed that adsorption and retention of ammonium nitrogen applied in soil matrix accounted for approximtely 70-90 percent of the ammonium nitrogen applied in simulated wastewater. Wastewater containing organic carbon noticeably reduced nitrates in the effluent but only slightly affected the recovery of ammonia. Estimation of nitrogen balance in this study indicated that the overland flow system was capable of removing 80-90 percent of the added ammonium nitrogen within the concentration range normally found in municipal wastewater. However, labeled nitrogen data showed that an average of 11-21 percent of the nitrogen was taken up by the ryegrass, and approximately 5-10 percent was immobilized and incorporated into soil organic nitrogen. (SWF)

ACC# : L000975
AUTHOR: Winneberger, J.H.T.
AFFIL : Private Consultant
TITLE : On-Site Waste Management - Volume II
SOURCE: Hancor, Inc., P.O. Box 1047, Findlay, Ohio 45840 (41 pages)
YEAR : c. 1972

TEXT : Presents an analysis of estimated nitrogen production by a planned community sewer system. Estimated nitrogen from a sewage treatment plant is calculated along with nitrogen from a septic-tank disposal field. Describes pertinent points of the nitrogen cycle, including nitrogen fixation, nitrification and denitrificaiton. (SWF)

ACC# : L000976
AUTHOR: Van de Graaff, R. H. M., Brouwer, J., Willatt, S. T.
AFFIL : Soil Conservation Authority, State Rivers and Water Supply Commissions; School of Agriculture, LaTrobe University, Bundoora, Victora
TITLE : On-Site Septic Tank Effluent Absorption - the Effects of Soil and Land Features
SOURCE: Soil Conservation Authority, Victoria, Australia (16 pages)
YEAR : 1980
TEXT : Based on widespread experiences with septic systems in Victoria, Australia, this is a general overview of both soil absorption through the use of absorption trences, and the factors controlling soil absorption. Discusses the function and limitations of the system as a whole and the crust or clogging layer, in particular. Also covered are the effects of soil and land features, such as hydraulic conductivity, depth-to-free water, and site drainage, slope, depth-to-rock or impervious layer, gravel and stones, boulders and outcrop, climate and vegetation. (SWF)

ACC# : L000977
AUTHOR: Duff, B. F.
AFFIL : Environmental Engineer, Environmental Improvement Division, Engineering Section, Santa Fe, New Mexico 87503
TITLE : Well, What Can I Do Then? Alternatives to a Septic Tank/Absorption Field
SOURCE: Individual Onsite Wastewater Systems - Proceedings of the Fifth National Conference, Ann Arbor Science Publishers, Inc., 61-67 (7 pages)
YEAR : 1978
TEXT : Presents on-site alternatives to conventional septic tank/absorption field wastewater treatment. Alternatives are intended for situations where septic tank/absorption field will not work because of site requirements and terrain characteristics. Alternatives discussed include aerobic systems, evapotranspiration systems, vault systems, composting toilets, greywater reuse, lagoons, and alternative fields such as mounds and sand filters. (SWF)

ACC# : L000978
AUTHOR: Bouma, J., Hillel, D. L., Hole, F. D., Amerman, C. R.
AFFIL : The Soil Survey Division, Wisconsin Geological and Natural History Survey, University Extension, University of Wisconsin, Madison, WI
TITLE : Field Measurement of Unsaturated Hydraulic Conductivity by Infiltation Through Artificial Crusts
SOURCE: Soil Science Society of America Proceedings, 35(2):362-364 (3 pages)
YEAR : 1971
TEXT : Field trials were made to test the applicability of a recently proposed method for measuring the unsaturated hydraulic conductivity (k) of crust-capped soil materials in a one-dimensional flow system, where the matric suction gradient is zero. K-values were determined from infiltration rates into crust-capped soil columns carved out in-situ 30 cm in height. Matric suctions were measured with tensiometers. Examples are given for four Wisconsin soil horizons. (AU)

ACC# : L000979
AUTHOR: Pitt., W. A. J. , Mattraw, H. C., Klein, H.
AFFIL : N/A
TITLE : Groundwater Quality in Selected Areas Serviced by Septic Tanks, Dade County, Florida
SOURCE: U.S. Dept. of the Interior - Geological Survey, Tallahassee, Florida, Open File Report 75-607 (84 pages)
YEAR : 1975
TEXT : From 1971-1974, wells at five selected areas in Dade County, Florida were monitored for chemical, physical, bacteriological and virological groundwater characteristics. Shallow wells were affected primarily by storm water runoff, with some indication of contamination by septic tank effluent. Wells deeper than twenty feet did not experience significant groundwater contamination due to dispersing dilution and chemical processes which prevented accumulation of septic effluent. Groundwater quality was influenced greatest by the compositon and hydraulic conductivity of the sand and limestone aquifers. (SWF)

ACC# : L000980
AUTHOR: Sharpe, W. E., Fletcher, P.W.
AFFIL : Pennsylvania State University, University Park, Pennsylvania 16802
TITLE : Impact of Water Saving Device Installtion Programs on Resource Conservation
Institute for Research on Land and Water Resources, Research Publication 98 (51 pages)
SOURCE: RESEARCH PUBLICATION 98, INSTITUTE FOR RESEARCH ON LAND AND WATER RESOURCES, THE PENNSYLVANIA STATE UNIVERSITY, UNIVERSITY

PARK, PA 16802
YEAR : 1977
TEXT : The water saving programs of the Washington Suburban Sanitary Commission (WSSC) were evaluated and found to have been effective in reducing customer water use. The methods used by the WSSC were analyzed and changes were suggested where appropriate. A study of the effectiveness of bathing shower flow controls in college dormitories showed savings to The Pennsylvania State University for such a program were estimated to be $100,000 annually. A comparison of costs for on-lot sewage disposal facilities with and without minimum water use fixtures was made. Cost savings were shown for elevated sand mound and holding tank systems using minimum water use technology based on calculated wasteflow reductions. (AU)

ACC# : L000981
AUTHOR: Basu, D.
AFFIL : Design Division, Municipality of Surrey, British Columbia, Canada
TITLE : Vacuum Sewer System
SOURCE: The B.C. Professional Engineer, May 1979 (7 pages)
YEAR : 1979
TEXT : This article is a short description of a vacuum sewage system used in British Columbia. One thousand homes are served with this system, which is more cost-effective than 650 septic tanks. The system, largest institution of its kind in North America at that time, consists of two collection stations and seven to eight vacuum lines feeding each station. Fifty to 75 houses are served per vacuum line. The maximum length of any single line is 1500 meters, and the diameter of the PVC line is 25 mm to 150 mm. (SWF)

ACC# : L000982
AUTHOR: Crates, F. J.
AFFIL : N/A
TITLE : On-Site Waste Management: Past, Present and Future
SOURCE: Land and Water, January 1980 (3 pages)
YEAR : 1980
TEXT : Installation and maintenance are the major factors affecting performance of on-site systems. A number of poor practices are discussed. The role of installers and local sanitarians is described especially with respect to septic tank and soil absorption systems. (SWF)

ACC# : L000983
AUTHOR: Hagedorn, C., McCoy, E. L., Rahe, T. M.
AFFIL : Mississippi State University, Oregon State University and Consulting Environmental Sanitarians, respectively
TITLE : The Potential for Ground Water Contamination from Septic Effluents
SOURCE: Journal of Environmental Quality, 10(1):1-8 (8 pages)
YEAR : 1981
TEXT : Large populations in both rural and urban areas rely on septic tank soil-absorption treatment systems as the principal disposer of domestic waste materials. Potential ground water pollutants, including pathogens, are removed from percolating drainfield effluents by microbial activity, soil filtration, and adsorption, preventing their entry into ground water. There is accumulating evidence, however, that water supplies in many areas of the United States are receiving increased pollution loads, and the source has frequently been traced to contaminated recharge waters. This paper reviews literature on both the conditions present where conventional disposal systems malfunction, and the mechanisms by which incompletely treated septic wastes may come into contact with various water resources. Current information regarding the function of a drainfield system and an examination of data from recent microbiological investigations on conditions necessary for the removal of enteric organisms from effluent waters are also included. Research needs are addressed with emphasis on problem areas which need further investigation in order to develop safe guidelines for determining the suitability of septic tank systems in relation to regional soil-water conditions. (AU)

ACC# : L000984
AFFIL : Larkin and Associates Consulting Engineers
TITLE : Environmental Constraints Challenge Designers of Shoreline Community Near Kansas City, Missouri
SOURCE: Professional Engineer, June 1975: 42-44 (3 pages)
YEAR : 1975
TEXT : Waste disposal at Weatherby Lake, Missouri, was initially by septic tanks and absorption fields. The absorption field effluent was piped to the lake. Deterioration of the lake's water quality was apparent, and an alternative to disposal was required. Alternatives and the estimated costs included 1) vacuum pump system, 2) gravity pipe system ($2.25 million) and 3) grinder pump ($1.03 million). The grinder pump system

was chosen as the best alternative. Weatherby (population - 1,200) finally used 309 grinder pumps; 35,000 linear feet of pressure sewer and diameter of pipe varied from 2 1/4" to 6"; 37,100 linear feet of 1 1/4" pressure service lines; 42 air relief valves; 24 flushing and clean-out connections; and 5,300 linear feet of 8" gravity sewer to connect with Kansas City's sewer system. A 160 psi PVC pipe was used for the low pressure pipe. (SWF)

ACC# : L000985
AUTHOR: Ketchum, L. H., Irvine, R. L., Liao, P. C.
AFFIL : Civil Engineering, University of Notre Dame, Indiana
TITLE : First Cost Analysis of Sequencing Batch Biological Reactors
SOURCE: Journal Water Pollution Control Foundation, 51(2):288-297 (10 pages)
YEAR : 1979
TEXT : Estimates of initial construction costs ("first costs") have been made comparing biological waste treatment using sequencing bath reactors with treatment using more conventional methods. The estimates were directed at facilities sized to population equivalents of 1,000 and 10,000, respectively. The smaller facility was assumed to use a single-cell, earthen-lagoon batch reactor system. Both were compared to various more conventional systems. Both batch reactor systems seem to offer an opportunity to meet the most stringent effluent limitations. First costs will be no more, and probably less, than those of conventional treatment systems. Costs of operation and maintenance of the conventional and the batch reactor systems are expected to be about equal. (AU)

ACC# : L000986
AUTHOR: McClelland, N. I.
AFFIL : National Sanitation Foundation
TITLE : Past, Present and Potential Role of NSF in Onsite Wastewater System Technology
SOURCE: Individual Onsite Wastewater Systems - Proceedings of the Fifth National Conference, 1978, Ann Arbor Science Publishers, Inc., P.O. Box 1425, Ann Arbor, Michigan, 48106: 41-59 (18 pages)
YEAR : 1979
TEXT : Explains the National Sanitation Foundation's (NSF) role in testing equipment for treating wastewater and conserving water. Items evaluated by NSF include package treatment plants, individual aerobic plants, grinder pumps, water recycle/reuse systems, waterless toilets, incinerators and pressure differential systems. The methodology for stress testing in order to simulate varying load conditions is described. Included is a discussion of the development and revision of standard No. 40 upon which the performance of plants for wastewater treatment is evaluated. (SWF)

ACC# : L000987
AUTHOR: Golueke, C. G., Diaz, L. F.
AFFIL : Cal Recovery Systems, Inc., Senior and Consulting Editors, BioCycle
TITLE : Operating a Solar Aquaculture Sewage Treatment Plant
SOURCE: BioCycle, 22(1):38-39 (2 pages)
YEAR : 1981
TEXT : Article serves as a "progress report" on the Hercules, CA, water hyacinth wastewater treatment system after five months of operation. Problems with construction and operation of the plant during the "shakedown" are discussed from a nontechnical perspective. (SWF)

ACC# : L000988
AUTHOR: N/A
AFFIL : Environmental Sanitation Information Center, Asian Institute of Technology, P.O. Box 2754, Bangkok, Thailand
TITLE : Aquatic Plants: From Bane to Boon
SOURCE: Environmental Sanitation Information Center, Enfo, 3(2):8-11 (4 pages)
YEAR : 1981
TEXT : Article summarizes research on water hyacinths carried out by the Asian Institute of Technology. Use of composted water hyacinth and fish cultivation (Tilapia nilotica sp.) has proved to be a practical application of the denitrital food chain. By composting vegetation which is not palatable to herbivorous fish, the material could be converted to detritus which contains microbial protein. Other aquacultural systems and productive uses of "weeds" are discussed. The design of a water hyacinth compost pit for agricultural use developed at Gauhatfi University is described. Other studies mentioned include biogas production from nightsoil and water hyacinth mixtures, as well as raising fish on a biogas slurry. Additional references include the Clearinghouse of SEMEO Regional Center for Tropical Biology (BIOTROP) Bogor Indonesia. (SWF)

ACC# : L000989
AUTHOR: Middlebrooks, E. J., Middlebrooks, C. H., Reed, C.

AFFIL : College of Engineering, Utah State University
TITLE : Energy Requirement for Small Wastewater Treatment Systems
SOURCE: Journal WPCF, 53(7): 1172-1197 (25 pages)
YEAR : 1981
TEXT : Summrizes the energy requirments for all viable alternatives currently available for treatment of flow rates of 0.05 to 5 mgd of wastewater. Various treatment combinations are compared, and the energy requirements for the most viable alternatives are presented in tabular form. The data can be combined to produce estimates of energy requirements for all currently available unit operations and processes. (AU)

ACC# : L000990
AUTHOR: Bernhart, A. P.
AFFIL : The Bernhart Group, Inc., Environmental Consultants, Washington, DC and Toronto, Canada
TITLE : Evapotranspiration - A Viable Method of Reuse (or Disposal) of Wastewater in North America, South of the 52nd or 55th Parallel
SOURCE: Individual Onsite Wastewater Systems - Proceedings of the Fifth National Conference, 1978, Ann Arbor Science Publishers, Inc.: 185-195 (11 pages)
YEAR : 1979
TEXT : Discusses use of evapotranspiration beds for disposal of wastewater. Activities of aerobic microorganisms and transpiration by plants increase evapotranspiration rate. Presents examples of three types of evapotranspiration installations along with a comprehensive list of ET and ETA installations around the country. Presents an ETA bed sizing equation that adjusts for aerobic pretreatment, which is stressed as having a significant impact on system performance. (SWF)

ACC# : L000991
AUTHOR: N/A
AFFIL : Pollutech Pollution Advisory Services Limited, Oakville, Ontario
TITLE : Nutrient Control in Sewage Lagoons
SOURCE: Environment Canada, Research Report No. 8 (63 pages)
TEXT : This project was initiated to provide documentation on the effects and behavior of precipitated phosphates in sewage lagoons. Design and operational problems which might arise from chemical dosing of lagoon influents were investigated as well as the effects of seasonal variation of temperature. The role of pH in both the removal and resolubilization of phosphorus in waste treatment lagoons was also investigated. The study utilized laboratory-scale reactors, computer models and full-scale lagoons. (SWF)

ACC# : L000992
AUTHOR: U.S. EPA
AFFIL : U.S. EPA Office of Water Program Operations
TITLE : How to Obtain Federal Grants to Build Municipal Wastewater Treatment Works, MCD-04
SOURCE: General Services Administration (8FFS), Centralized Mailing List Service, Bldg. 41, Denver Federal Center, Denver, Colorado (27 pages)
YEAR : 1981
1981
TEXT : This handbook helps public officials understand both the "in's and out's" and the "do's and dont's" involved in carrying out the Construction Grants Program. It summarizes the many regulations, guidelines, technical bulletins and policy statements governing the program. The information will enable municipal officials to both insure that consultants are doing their job and assure that documents necessary for grant awards are started and completed with minimum loss of time and effort. (SWF)

ACC# : L000993
AUTHOR: Kreissl, J. F., Smith, R., Heidman, J. A.
AFFIL : US-EPA
TITLE : The Cost of Small Community Wastewater Alternatives
SOURCE: Wastewater Alternatives for Small Communities, NTIS No. PB 81-131658 (25 pages)
YEAR : 1978
TEXT : Cost estimates for rural wastewater treatment systems with regard to construction, operation and maintenance are presented in concise itemized and tabular form. The presentation lists STEP pressure sewers, small-diameter gravity sewers and vacuum sewers as economically advantageous to conventional gravity sewer systems under identical conditions. On-site systems, evapotranspiration disposal, surface discharge, aerobic systems and disinfection units are also discussed in terms of economic benefit for the individual homeowner. (SWF)

ACC# : L000994
AUTHOR: Walker, M., Poorbaugh, J. H., Enferadi, K. M., Wilson, B. A.
AFFIL : Office of Appropriate Technology, California, and Dept. of Health Services, California
TITLE : Rural Wastewater Disposal Alternatives Project
SOURCE: Compost Science/Land Utilization, 21(2):22-24 (3 pages)
YEAR : 1980
TEXT : Discusses a California study to evaluate approximately 30 waterless toilets and 10 greywater reuse systems for public health and performance reliability. A variety of biological, physical, and chemical tests will be performed on both the toilet and greywater systems. (SWF)

ACC# : L000995
AUTHOR: Peters, G. O., Hediger, E.
AFFIL : Wapora Inc., Chevy Chase, MD
TITLE : Generic Environmental Impact Statement for Wastewater Management in Rural Areas (Executive Summary)
SOURCE: U.S. Environmental Protection Agency; Region V, Chicago, IL (16 pages)
TEXT : This environmental impact statment examines EPA's review and approval of facility plans in unsewered rural lake communities in EPA Region V. On-site recommendations offer an average savings of $5,200/dwelling. Site survey performance data are critical to realizing cost savings and water quality goals. Public involvement and leadership could resolve many owner related problems such as adequate maintenance.

The EIS proposes and examines the following actions for implementation by Region V and state construction grant agencies: encourage community supervision of small wastewater flows facilities; develop evaluation methods for optimum operation of existing on-site systems; private collection and analysis of on-site and small-scale system performance data; review eligibility regulations; encourage states to play active roles in rural wastewater management; recommend facilities planning and impact analysis methodologies; encourage grantee evaluation and adoption of mitigation measures; encourage public participation; and encourage grantees; innovation with small waste flows technologies and community management. (AU/SWF)

ACC# : L000996
AUTHOR: Bowne, W. C., Ball, H. L.
AFFIL : Special Projects Engineer, Douglas County, Oregon, and BHW Engineering, Inc.l, Roseburg, Oregon, Respectively
TITLE : Pressure Sewer Systems Proves Effective, Economical
SOURCE: Public Works, March: 83-86 (4 pages)
YEAR : 1981
TEXT : Describes the world's largest septic tank effluent pump (STEP) system, located in Glide, Oregon. System cost, O & M practices and requirements are described. Energy requirements of the STEP system are presented. A description is given of the on-lot septic tanks and the oxidation ditch treatment facility used to treat the septic tank effluent. Waste characteristics from the STEP system are compared to those of a conventional gravity system. (SWF)

ACC# : L000997
AUTHOR: Berkowitz, S. J.
AFFIL : Center for Improving Mountain Living, Western Carolina University, Cullowhee, North Carolina
TITLE : On-Site Wastewater Treatment Problems and Alternatives for Western North Carolina
SOURCE: Water Resources Research Institute of the University of North Carolina, Report No. 163 (162 pages)
YEAR : 1981
TEXT : Report summarizes individual wastewater system operation for 100,000 people in the western North Carolina mountains. Statistics on system failure and water quality are provided for the four counties studied in detail. Alternatives considered to address the problems were expanded central collection and treatment, special financial assistance programs, alternative on-site treatment systems, and maintenance programs. Alternative systems, including the low pressure pipe leaching system, are described. Lengthy appendices present data in graphic and tabular form. (SWF)

ACC# : L000998
AUTHOR: Ward, R. C.
AFFIL : Department of Agricultural and Chemical Engineering, Colorado State University
TITLE : Alternative Management Strategies for Colorado's Small Wastewater Flows
SOURCE: Fourth Workshop on Home Sewage Disposal in Colorado (27 pages)
YEAR : 1981
TEXT : Paper describes the required "service industry" components of small flow management as planning, design, installation, operation, maintenance,

and repair. Government regulations which provide the most effective and efficient management of the required components are addressed. Next, supporting agencies which conduct research, test equipment and educate are mixed into the total small flows service system. Various management strategies for small flows are defined for a number of states, with emphasis on New Hampshire, Maine, Pennsylvania, California and Illinois. Finally, several management strategies which could be developed for improving the efficiency and effectiveness of the program in Colorado are presented. (SWF)

ACC# : L000999
AUTHOR: Stecker, F. P.
AFFIL : Environmental Division of Donohue & Associates, Inc. Sheboygan, Wisconsin
TITLE : A Successful Low Technology Wastewater Process
SOURCE: WATER/Engineering & Management, 128(8):46-48 (3 pages)
YEAR : 1981
TEXT : This descriptive article defines the advantages of a recirculating sand filter selected for Baileys Harbor, Wisconsin. The system was found most cost-effective to treat the wastewater from the downtown area and slug loading from holding tanks brought from outlying areas. The scenic, shallow bay placed a 20 mg/1 BOD limit on the permit, which was most cost-effectively met with the recirculating sand filter. Design specifications for the recirculating sand filter are given. (SWF)

ACC# : L001000
AUTHOR: DeWalle-FB
AFFIL : Dept. of Environmental Health, University of Washington
TITLE : Failure Analysis of Large Septic Tank Systems
SOURCE: ASCE, 107 (EE):229-241 (13 pages)
YEAR : 1981
TEXT : Defines Washington State's Department of Social and Health Services large system design criteria and compares it with the regulations governing residential systems and with recently published data on wastewater generation and soil loading rates. Causes of system failure are reviewed. A summary of large and small system failure rates by county includes estimates of total cost for repairs state-wide. Statistics defining the rate of installation of large and residential on-site systems versus an increase in population are presented. The article stresses the need to maintain records and study failure rates, using this information as the basis for revising design requirements and procedures for small and large septic tank soil absorption systems. (SWF)

ACC# : L001001
AUTHOR: McNutt, H. P., Beare, J. A.
AFFIL : Dept. of Social and Health Services
TITLE : On-Site Sewage Disposal Program: A Preliminary Status Report to the State Legislature
SOURCE: Washington State Dept. of Social and Health Services (Feb. 1977) publication no. 77-1
YEAR : 1977
TEXT : The development and status of the Department of Social and Health Services programs for on-site sewage disposal are examined. Five approaches studied by the department were: treatment by subsurface disposal, system modification, disposal by open discharge, wastewater segregation and system improvement. A number of alternative systems are described and evaluated. These include: mounds, evapotranspiration, sand filters, alternating beds, dosing tanks, absorption field modification, aerobic treatment, alternative toilets, as well as the standard absorption trench. Advantages, disadvantages, maintenance, operation and costs for each of the alternatives are provided when possible. (SWF)

ACC# : L001002
AUTHOR: DeWalle, F. B., Schaff, R. M.
AFFIL : Dept. of Environmental Health, University of Washington, Seattle, Washington
TITLE : Ground-Water Pollution by Septic Tank Drainfields
SOURCE: Journal of the Environmental Engineering Division, 106(EE3):631-646 (9 pages)
YEAR : 1980
TEXT : This study evaluated well records and water samples with corresponding element analyses obtained over a 30-year period from a densely populated Washington river basin in order to identify trends and correlations between pollution indicators. Increases in values for nitrate, chloride, and specific conductance were observed and attributed to the presence of sewage effluent from septic tank drainfields, since the deteriorating groundwater quality was most noticeable in unsewered

areas. No significant correlations were noted in the sewered areas. Winter months produced the highest nitrate and coliform concentrations, which were attributed to infiltrating rainfall dissolving and leaching the contaminants downward. (SWF)

ACC# : L001003
AUTHOR: Vaughn, J. M., Landry, E. F., Beckwith, C. A., Thomas, M. Z.
AFFIL : Department of Energy and Environment, Brookhaven National Laboratory, Upton, New York 11973
TITLE : Virus Removal During Groundwater Recharge: Effects of Infiltration Rate on Adsorption of Poliovirus to Soil
SOURCE: Applied and Environmental Microbiology, 41(1):139-147 (9 pages)
YEAR : 1981
TEXT : Studies were conducted to determine the influence of infiltration rate on poliovirus removal during groundwater recharge with tertiary-treated wastewater effluents. Experiments were conducted at a uniquely designed, field-situated test recharge basin facility through which some 62,000 cubic meters of sewage had been previously applied. Recharge of high infiltration rates (75 to 100 cm/h) resulted in the movement of considerable numbers of seeded poliovirus to the groundwater. Moderately reduced infiltration rates (6 cm/h) affected significantly improved virus removal. Very low infiltration rates (.05 to 1.0 cm/h), achieved by partial clogging of the test basin, yielded the greatest virus removal efficiencies. (AU)

ACC# : L001004
AUTHOR: Brown, K. W., Wolf, H. W., Donnelly, K. C., Slowey, J. F.
AFFIL : Texas A & M University, College Station, TX 77843
TITLE : The Movement of Fecal Coliforms and Coliphages Below Septic Lines
SOURCE: Journal of Environmental Quality, 8(1):121-125 (5 pages)
YEAR : 1979
TEXT : Examines the movement of fecal coliforms and coliphages below subsurface applications in three undisturbed soils containing concentrations of 80, 41, and 7.6 percents and, respectively. Leachate samples were analyzed on a continuous basis, and at the end of the study the soils below the septic lines were dissected and sampled on a grid pattern. Results showed very limited concentrations of both fecal coliforms and coliphages, indicating that 120 cm of any of the soils tested were sufficient to minimize the possibility of groundwater pollution from septic effluent disposal. (SWF)

ACC# : L001005
AUTHOR: Neuberger-M
AFFIL : NA
TITLE : Why Water Hyacinths?
SOURCE: Land and Water (USPS 054-930):21-22 (2 pages)
YEAR : 1981
TEXT : A method to utilize water hyacinths for wastewater treatment and production of usable by-products is underway at a new community at Coral Springs, Florida. The five-pond system daily treats 180,000 gallons of wastewater. Nitrogen and phosphorus are removed from the water and incorporated into the biomass of the plant. The hyacinths are harvested, dried and processed into fertilizer. This system realizes a 35 percent savings over conventional wastewater treatment methods. (SWF)

ACC# : L001006
AUTHOR: Julius, D. S.
AFFIL : Energy, Water and Telecommunications, The World Bank, Washington DC
TITLE : An Economic Appraisal of Sanitation Alternatives
SOURCE: Progress in Water Technology, 11(1):251-258
YEAR : 1978
TEXT : The theory of economic costing is briefly reviewed and applied to the analysis of alternative sanitation technologies. Using this method the costs from 44 systems in 12 countries are computed and compared. A value engineering approach is taken to analyze cost sensitivities and productive areas for future technical research. (AU)

ACC# : L001007
AUTHOR: Ott, C. R., Segall, B. A.
AFFIL : University of Lowell, Lowell, Massachusetts 01854
TITLE : Monioring Septage Addition to Wastewater Treatment Plants - Volume II: Vacuum Filtration of Septage
SOURCE: Municipal Environmental Research Laboratory, U.S. Environmental Protection Agency, Cincinnati, Ohio 45268 (149 pages)
YEAR : 1980
TEXT : This study examined the feasibility of using conventional vacuum filtration to dewater conditioned septage by itself and in combination

with thickened waste activated sludge (TWAS). Septage conditioning was carried out in three separate tests using aluminum sulfate, ferric chloride and sulfuric acid. Laboratory experiments used a filter leaf apparatus to simulate a coil spring vacuum filter. The capillary suction test was used to estimate filterability. Field studies, utilizing a full-scale vacuum filter and large quantities of septage, were conducted at the Medfield, Massachusetts, wastewater treatment plant. Results showed that vacuum filtration of a combined mixture of TWAS and conditioned septage would provide excellent cake yields and filtrate quality with a lower treatment cost than would the direct addition of septage to the plant's liquid steam. (AU/SWF)

ACC# : L001008
AUTHOR: Rao, V. C., Lakhe, S. B., Waghmare, S. V.
AFFIL : National Environmental Engineering Research Institute, Nagpur, India
TITLE : Virus Removal in Waste Stabilization Ponds in India
SOURCE: Water Research, 15(7):773-778 (6 pages)
YEAR : 1981
TEXT : Among the low cost waste treatment methods suitable for tropical developing countries, stabilization ponds are shown to be least expensive and simple to construct and operate. A quantitative evaluation of the extent of virus removal in both pilot and full-scale ponds have been made in different seasons. Experimental pilot ponds operated at depths of three to five feet at different loading rates indicated an average virus removal in the range of 86 to 95 percent. Full-scale ponds with detention times ranging from 2.7 to 172 days showed virus removal efficiencies ranging from 88 to 98 percent. (AU)

ACC# : L001009
AUTHOR: Walker, B. W.
AFFIL : Oxfam
TITLE : The Oxfam Sanitation Unit
SOURCE: Oxfam, 274 Banbury Road, Oxford OX2 7DZ
YEAR : 1975
TEXT : The design and construction information for the Oxfam Sanitation Unit is provided in detail. Special features, uses and operational data of the unit are presented. Numerous diagrams illustrate the system and the installation procedure. (SWF)

ACC# : L001010
AUTHOR: Farrell, R. P.
AFFIL : Environment/One Corporation
TITLE : Operating Experience and Cost From Some Pressure Sewer Systems
SOURCE: Individual Onsite Wastewater Systems-Proceedings of the Seventh National Conference (16 pages)
TEXT : Discusses operating experience and cost of a grinder pump-pressure sewer system. Applications and descriptions of pressure sewer systems are discussed. Servicing, user education, and equivalent annual cost of the proprietary Environment-One grinder pump is provided. (SWF)

ACC# : L001011
AUTHOR: Dale, J. T.
AFFIL : Journal Water Pollution Control Federation
TITLE : World Bank Shifts Focus on Third World Sanitation Projects
SOURCE: Journal Water Pollution Control Federation, 51(4):662-665 (4 pages)
YEAR : 1979
TEXT : Discusses the expansion of loan programs by the World Bank to Third World Sanitation projects. Increased funding for lower-cost alternatives while less emphasis on sewage and wastewater treatment plant systems. (SWF)

ACC# : L001012
AUTHOR: Ward, R. W., DeGraeve, G. M.
AFFIL : Grand Valley State College, Allendale, Michigan
TITLE : Residual Toxicity of Several Disinfectants in Domestic Wastewater
SOURCE: Journal Water Pollution Control Federation 51(1):46-60 (15 pages)
YEAR : 1978
TEXT : Presents study findings dealing with effects of residual toxicity concentrations of chlorine, bromine chloride and ozone on fathead minnows (Pimephales promelas). These disinfectants have been shown to exert toxic effects on aquatic life of receiving waters. Study shows adverse effects of residual chlorine on fathead minnows are eliminated by dechlorination with sulfur dioxide. (SWF)

ACC# : L001013
AUTHOR: Fiphe, J. H., Lloyd, B., Webber, D.
AFFIL : Oxfam

TITLE : Oxfam's Sanitation Unit: The Design and Testing of a Sanitation and Sewage Treatment Unit for Disasters and Long Term Use.
SOURCE: Oxfam, 274 Banbury Road, Oxford OX27DZ
YEAR : 1975
TEXT : A small, light-weight sanitation unit, using simple construction methods and materials, was developed for underdeveloped countries needing excreta disposal for emergency and long-term use. The unit can provide sanitation for 500 people and be constructed in a day. Twenty glass fiber squatting plates connected in series to two 21,000 liter butyl rubber sedimentation tanks, providing an eight to ten day retention time under strictly anaerobic conditions, effect a satisfactory treatment of the waste. Various pathogenic organisms, causing gastrointestinal diseases, were reduced to levels below the infective dose needed to cause disease. An optional percolation tank, constructed of locally available stone, can be used to further purify the effluent. (SWF)

ACC# : L001014
AUTHOR: Tridech, S., Englande, A. J., Herbert, M., Wilkinson, R. F.
AFFIL : Department of Environmental Health Sciences, Tulane University, New Orleans, Louisiana
TITLE : Kinetics of Trace Contaminant Removal From Secondary Domestic Effluent by Vascular Aquatic Plant Systems
SOURCE: Water Pollution Control Federation Conference, Las Vegas, Nevada (31 pages)
TEXT : Experimental data on organic, nutrient and trace contaminant removals from domestic wastewater secondary effluent by selected vascular aquatic plants were collected, and the system was mathematically modeled for kinetic removal of the substrates. Batch, continuous and full flow studies were conducted to screen plant species and to determine the feasibility of incorporating such a treatment system on a full-scale basis. (SWF)

ACC# : L001015
AUTHOR: Hurd, M. (Dir.)
AFFIL : U.S. EPA
TITLE : Annotated Bibliography for Water Quality Management (6th Ed.)
SOURCE: U.S. EPA, Division of Water Planning (WH-554) Washington, DC
YEAR : 1979
TEXT : An annotated bibliography and references applicable to 208 planning have been compiled. There are five categories of information provided: basic information materials on water quality management; exhibits, films, training programs; Water Planning Division publications; NTIS publications; and other publications such as volumes one, two and three of the 208 Data Clearinghouse. Instructions for ordering information from the Government Printing Office, NTIS and EPA's North Carolina Warehouse are also provided. (SWF)

ACC# : L001016
AUTHOR: Cameron, J. J., Smith, D. W.
AFFIL : Northern Technology Centre, Water Pollution Control Directorate, Enviromental Protection Service, Fisheries and Environment Canada
TITLE : Annotated Bibliography on Northern Environmental Engineering, 1974-75
SOURCE: Fisheries and Environment Canada, Economic and Technical Review Report EPS 3-WP-77-6 (156 pages)
YEAR : 1977
TEXT : The first of a collection of annotated bibliographies deals with various aspects of environmental engineering, including wastewater and solid waste disposal. Also contains a reference list of recent conference proceedings and bibliographies and literature surveys of interest to northern environmental engineers. Two key indices (alphabetical and by subject) are also included. (SWF)

ACC# : L001017
AUTHOR: Armstrong, B. C., Cameron, J. J.
AFFIL : Northern Technology Unit, Water Pollution Control Directorate, Environmental Protection Service, Fisheries and Environment Canada
TITLE : Annotated Bibliography on Northern Environmental Engineering, 1976-77
SOURCE: Environment Canada, Economic and Technical Review Report EPS 3-WP-79-1 (134 pages)
YEAR : 1979
TEXT : The second of a collection of annotated bibliographies deals with various aspects of environmental engineering, including wastewater and solid waste disposal. Also contains a reference list of recent conference proceedings and bibliographies and literature surveys of interest to northern environmental engineers. Two keyword indices (alphabetical and subject) are also included. (SWF)

ACC# : L001018

AUTHOR: Cooley, J. W.
AFFIL : U.S. Dept. of Agriculture, North Central Forest Experiment Station, East Lansing, Michigan
TITLE : Christmas Trees Enhanced by Sewage Effluent
SOURCE: Compost Science/Land Utilization, 21(6):28-30 (3 pages)
YEAR : 1980
TEXT : A five-year study in Michigan was conducted to determine the effect of sewage effluent irrigation on growth of six Christmas tree species. Uniform application of sewage effluent during the growing season increased survival and growth of white spruce, balsam fir and three varieties of Scoth pine, although it did not significantly enhance survival and growth of Douglas firs. Cultivating Christmas trees on sewage effluent irrigation sites may provide a marketable product for small sewage treatment facilities. (SWF)

ACC# : L001019
AUTHOR: Goldstein, N.
AFFIL : NA
TITLE : Land Treatment of Wastewater
SOURCE: BioCycle, 22(1):34-37 (4 pages)
YEAR : 1981
TEXT : Discusses why land treatment of wastewater is "best practicable" method of wastewater treatment for specific areas and highlights three innovative and alternative wastewater treatment facilities in Muskegon County, Michigan, and El Reno, Oklahoma and Clayton Counties, Georgia. These highlights give a general facility description, capacity of the plant, type of land treatment, acreage involved and available treatment and construction costs. (SWF)

ACC# : L001020
AUTHOR: Young, E. E.
AFFIL : Natural Resource Economics Div., Economics, Statistics, and Comparatives Service, USDA, University Park, PA
TITLE : Costs of Maintaining Public Health Standards for Spray Irrigation of Municipal Waste Water Systems
SOURCE: Journal of Environmental Quality, 9(3):354-358 (5 pages)
YEAR : 1980
TEXT : Cost Estimates of alternatives for controlling the spread of disease organisms in aerosols from municipal spray irrigation systems are compared to determine the conditions when a particular alternative is cost effective. A cost simulation model and previously published cost estimates are used to evaluate the cost effectiveness of the alternatives. The alternatives examined are assumed to provide a minimum level of disease prevention. Depending upon the circumstances, any of the alternatives evaluated may be cost effective. When chlorination provides a sufficient level of disinfection, it appears to be the least cost alternative. Two alternatives, substitution of surface for spray irrigation when surface terrain permits, and the use of buffer zones when land costs are low, are also likely to be cost effective. Buffer zones in excess of 500 meters can be cost effective, depending upon initial land costs and whether or not the buffer area can be farmed.

ACC# : L001021
AUTHOR: Osborne, J. M.
AFFIL : U. S. Forest Service, Pocatello, Idaho 83201
TITLE : Tertiary Treatment of Campground Waste Using a Native Minnesota Peat
SOURCE: Journal of Soil and Water Conservation, 30(5):235-236 (2 pages)
YEAR : 1975
TEXT : Discusses the use of peat as a filtration medium for tertiary treatment at a Minnesota campground. The system consists of a peat-sand filter bed, a sprinkler distribution system, and a perforated pipe for monitoring purposes. Samples were collected from spring melt until winter freeze and were analyzed for various chemical parameters including phosphorus, nitrogen, and fecal coliform bacteria. The peat was found to reduce the coliform bacteria by 99.99 percent, while phosphorus concentration was reduced from 7mg/l to about .03mg/l. Ammonia and nitrite forms of nitrogen showed a poor assimilation efficiency until mid-summer and then averaged 66 and 70 percent efficiency, respectively. (SWF)

ACC# : 1001022
AUTHOR: N/A
AFFIL : VITA (Volunteers in Technical Assistance)
TITLE : Village Technology Handbook
SOURCE: VITA, 3706 Rhode Island Avenue, Mt. Rainer, Maryland: 145-183 (39 pages)
YEAR : 1978
TEXT : This handbook contains a collection of, and practical information on,

wastewater topics. Particularly interesting is the section on health and sanitation which covers sanitary latrines and a specific parasitic disease named Bilharziasis. Types of tools, materials and methods of construction are included. Design situations and example problems are supplemented by numerous figures and diagrams. (SWF)

ACC# : L001023
AUTHOR: Boegly, W. J., Mixon, W. R., Rothenberg, J. H.
AFFIL : Oak Ridge National Laboratory, Oak Ridge, Tennessee and U.S. Department of Housing and Urban Development, Washington, DC
TITLE : Integrated Waste Management Systems - Onsite MIUS Applications
SOURCE: Individual Onsite Wastewater Systems - Proceedings of the Third National Conference, Ann Arbor Science Publishers Inc., P.O. Box 1425, Ann Arbor, Michigan (8 pages)
YEAR : 1977
TEXT : This paper discusses the MIUS system approach to community power, water and wastewater needs. This concept uses an onsite combined package unit designed specifically to provide small communities with electricity, portable water, and wastewater and disposal. All units would be centrally located and could provide partial or complete utility services. (SWF)

ACC# : L001024
AUTHOR: Teltsch, B., Kedmi, S., Bonnet, L., Borenzstajn-Rotem, Y., Katzenelson, E
AFFIL : Environment Health Laboratory, Hadassah Medical School, The Hebrew University, Jerusalem, Israel
TITLE : Isolation and Identification of Pathogenic Microorganisms at Wastewater-Irrigated Fields: Ratios in Air and Wastewater
SOURCE: Applied and Environmental Microbiology, 39(6):1183-1190 (8 pages)
YEAR : 1980
TEXT : Samples of air and corresponding wastewater samples were taken at wastewater spray-irrigated fields. The concentrations of salmonellae and enteroviruses present in these samples were determined and compared with those of coliforms, and the ratios between them were calculated. From the ratios of salmonellae to coliforms and enteroviruses to coliforms in the air, as compared to these ratios in the wastewater, it was concluded that the suitability of coliforms as an indication of airborne contamination caused by spray irrigation is questionable. (AU)

ACC# : L001025
AUTHOR: N/A
AFFIL : N/A
TITLE : Clean That Sewer System With Bugs?
SOURCE: Environmental Science and Technology, 10:1198-1199 (2 pages)
YEAR : 1979
TEXT : A special purpose bacteria, DBC-Plus (cultured by Flow Laboratories, Inc), can handle grease, oil, odors, and other such problems quite inexpensively. A chart is provided to specify how to use the bacteria. The article states that DBC-Plus lowers B.O.D. and has the capability of eliminating hydrogen sulfide. Cost benefits are discussed. (SWF)

ACC# : L001026
AUTHOR: McClelland, N. I. (ed.)
AFFIL : National Sanitation Foundation
TITLE : Individual Onsite Wastewater Systems - Proceedings of the Third National Conference, 1976
SOURCE: Ann Arbor Publishers Inc., P.O. Box 14251, Ann Arbor, MI 48106 (316 pages)
YEAR : 1977
TEXT : These 1976 proceedings include the following articles: The Next Steps in Protecting the Environment; A Consultant's View on Waste Disposal; The Social, Economic and Political Impacts of Onlot Sewage Disposal (L000097); U.S. EPA Response to PL 92-500 Relating to Rural Wastewater Problems-Office of Research and Development (L000233); U.S. EPA Response to PL 92-500 Relating to Rural Wastewater Problems-Office of Water Program Operations (L000079); HUD's Response to the Housing Crisis-Current Extent of Agency Involvement (L000077); Alternative Methods of Regulating Onsite Domestic Sewerage Systems (1000194); Onsite Wastewater Disposal: A Local Government Dilemma (L000173); An Overview of Disposal Options: The Ontario Program (L000204); Field Application: Sand Mound and Evapotranspiration Systems (L000202); Effluent Quality Considerations Affecting the Use of Sand Filters and Oxidation Lagoons (L000953); Treatment Systems Required for Surface Discharge of Onsite Wastewater (L000195); The Sewage Osmosis Concept for Onsite Disposal Systems (L000952); Soil Evaluation of Sites for Absorption Systems (L000198); Septage Disposal in Wastewater Treatment Plants (L000213); Collection Alternative: The Pressure Sewer (L000012); Management

Guidelines for Conventional and Alternative Onsite Sewage Systems-Washington State (L000197); Management Guidelines for Conventional and Alternative Onsite Sewage Systems-Pennsylvania (L000098); Report on the Ten State Committee for Onsite Sewage Systems (L000263); Individual Onsite Wastewater System Management in Colorado (L000269); New York State Standards for Individual Household Systems (L000142); State Agency Management Plans and Approval Practices for Maine (L000011); Integrated Waste Management Systems-Onsite MIUS Applications (L0001023); The Boyd County Demonstration Project-A System Approach to Individual Rural Sanitation (An Update) (L000257); Onsite Wastewater Facilities for Small Communities and Subdivisions (L000199); Integration of Onsite Disposal in a 201 Facilities Plan (L000004); Innovation in Wastewater Technology: The Challenge of the 1980s (L000009); Pollution Control-Pathway to Perfection or Perdition; As We Now Look Ahead. (SWF)

ACC# : L001027
AUTHOR: Winneberger, J.H.T., Anderman, W. H.
AFFIL : Department of Public Health, Placerville, California
TITLE : Failure of the "Engineering Approach" to Design of Septic-Tank Systems and the Development of Septic-Tank Districts
SOURCE: N/A
YEAR : 1971
TEXT : One-third of the "engineered" septic-tank systems in El Dorado County, California failed at or before three years. On this basis, it was recommended that delegating a problem lot solely to a licensed civil engineer is insufficient. Rather an on-site wastewater management system operated by a public entity is proposed. This system would be responsible for design, installation and maintenance of septic-tank systems on a district-wide basis. (SWF)

ACC# : L001028
AUTHOR: Deghi, G. S., Ewel, K. C., Mitsch, W. J.
AFFIL : School of Forest Resources and Conservation and Center for Wetlands and Dept. of Environmental Engineering Sciences and Center for Wetlands, University of Florida, Gainesville, Florida 32611
TITLE : Effects of Sewage Effluent Application on Litter Fall and Litter Decomposition in Cypress Swamps
SOURCE: Journal of Applied Ecology, 17(2):397-408 (12 pages)
YEAR : 1980
TEXT : Application of sewage effluent to cypress domes in Florida did not affect litter decomposition or increase litter accumulation during a two-year study period. Mean phosphorus concentration increased from first year to second year in the two sewage domes as compared to the groundwater-applied dome and the control dome. Tree diameter growth was found to be significantly greater in the three experimental domes than in the control domes due to increased nutrient availability. (SWF)

ACC# : L001029
AUTHOR: Pope, P. R.
AFFIL : Moulton Niguel Water District, Laguna Niguel, California 92677
TITLE : Wastewater Treatment by Rooted Aquatic Plants in Sand and Gravel Trenches
SOURCE: U.S. Environmental Protection Agency, Municipal Environmental Research Laboratory, Cincinnati, OH (6 pages)
YEAR : 1981
TEXT : A potential wastewater treatment process by Max Planck Institute (MPI) of West Germany was tested by Moulton Niguel Wastewater District, Laguna Niguel, California, under an EPA grant. The system consisted of earthen trenches filled with gravel and planted with reed Phragmites and the bulrush Scripus, respectively. Tests indicated a number of problems with the system, though results indicated that secondary effluent quality could be reached. Treatment of secondary effluent for removal of nitrogen and phosphorus was not effective. Initial results indicate that a further assessment of the system may be worthwhile. (SWF)

ACC# : L001030
AUTHOR: McClelland, N. I. (ed.)
AFFIL : National Sanitation Foundation
TITLE : Individual Onsite Wastewater Systems - Proceedings of the Fourth National Conference, 1977
SOURCE: Ann Arbor Science Publishers Inc., P.O. Box 14251, Ann Arbor, Michigan (238 pages)
YEAR : 1978
TEXT : The 1977 Proceedings contain: Clearer Concepts and a New Challenge; Onsite Systems: EPA's Construction Grants Program (L000019); Onsite Systems: Farmers Home Administration (L000016); State Programs and Perspectives (L000013); Local Experiences with Alternative Systems: Salvation, Circumvention, or Cop-Cut (L000014); Management Districts-A

Key to Implementing an Onlot Disposal Alternative (L000022); An Application of the Onlot Management Concept: Objectives, Responsibilities, and Costs (L000023); Implementation of Onsite Wastewater Management Arrangements-Overcoming Incentives for Inaction (L000021); Validating Onsite Treatment in California (L000271); Management of Rural Septic Systems Utilizing the Natural Resource Conservation District Specialist Program (1000018); Certification of Contractors (L000008); Certification of Sewage Enforcement Officers: An Onsite Management Alternative (L000024); Soil Testing Certification (L000261); An Operator's View of Performance: Sanitation District #3, Boyd County, Kentucky (L000176); Some Aspects of Composting Toilets with Specific Reference to Their Function and Practical Applications in Norway (L000003); Effects of Toilet Usage Patterns on Onsite Treatment Systems (L000002); Factors Affecting Acceptance of Waterless Toilets-The Maine Experience (L000020); Experiences with Owner-Built Onsite Waste Management Systems in California (L000092); Ozonation, Irradiation, Chlorination and Combinations: A Discussion of the Practicalities of Their Use in Smaller Water/Wastewater Treatment Systems (L000792); and You Broke My Cookies (L000714). The numbers following the title indicate the accession number under which the article's abstract may be found in the Bibliography and/or the Clearinghouse data base. (SWF)

ACC# : L001031
AUTHOR: Wang, D. S., Gerba, C. P., Lance, J. C.
AFFIL : Department of Virology and Epidemiology, Baylor College of Medicine; U.S. Water Conservation Laboratory; and U.S. Department of Agriculture
TITLE : Effect of Soil Permeability on Virus Removal Through Soil Columns
SOURCE: Applied and Environmental Microbiology, 42(1):83-88 (6 pages)
YEAR : 1981
TEXT : Laboratory experiments were performed on four different soils, using 100 cm long columns, to determine the extent of virus movement when wastewater percolated through the soils at various hydraulic flow rates. Unchlorinated secondary sewage effluent seeded with either poliovirus type 1 (strain LSc) or echovirus type 1 (isolate V239) was continuously applied to soil columns for three to four days at constant flow rates. Water samples were extracted daily from ceramic samplers at various depths of the column for the virus assay. The effectiveness of virus removal from wastewater varied greatly among the different soil types but appeared to be largely related to hydraulic flow rates. At a flow rate of 33 cm/day, Anthony sandy loam removed 99 percent of seeded poliovirus within the first seven cm of the column. At flow rates of 300 cm/day and above, Rubicon sand gave the poorest removal of viruses; less than 90 percent of the seeded viruses were removed by passage of effluent through the entire length of the soil column. By linear regression analysis, the rate of virus removal in soil columns was found to be negatively correlated with the flow rate of the percolating sewage effluent. There was no significant difference in rate of removal between poliovirus and echovirus in soil columns 87 cm long. The rate of virus removal in the upper 17 cm of the soil column was found to be significantly greater than in the lower depths of the soil column. This study suggests that the flow rate of water through the soil may be the most important factor in predicting the potential of virus movement into the groundwater. Furthermore, the length of the soil column is critical in obtaining useful data to predict virus movement into groundwater. (AU)

ACC# : L001032
AUTHOR: Dolan, T. J., Bayley, S. E., Zoltek, J., Hermann, A. J.
AFFIL : Center for Wetlands, University of Florida, Gainesville, Florida 32601
TITLE : Phosphorus Dynamics of a Florida Freshwater Marsh Receiving Treated Wastewater
SOURCE: The Journal of Applied Ecology, 18(1):205-219 (15 pages)
YEAR : 1981
TEXT : A study was made of the effect of secondarily treated effluent on the phosphorus budget of a central Florida freshwater marsh. In the first year the plot receiving the high rate of effluent showed increased net production of plant shoots, increased litter production, increased root and rhizome production and higher phosphorus concentrations in living and dead plant tissue compared with the control plot. Effluent treatments did not significantly increase the phosphorus concentrations measured in the groundwater draining from the experimental plots. Phosphorus budgets were constructed for the control plot and the plot receiving the high effluent treatment. The marsh successfully removed phosphorus from the effluent during the first year of application. It was concluded that long term use of the marsh for phosphorus removal may be contingent upon the phosphorus adsorption capacity of the soil and the rate of peat production. (AU)

ACC# : L001033

AUTHOR: Brister, G. H., Schultz, R. C.
AFFIL : Respectively, School of Forest Resource, University of Georgia, Dept. of Forestry, Iowa State University
TITLE : The Response of a Southern Appalachian Forest to Waste Water Irrigation
SOURCE: Journal of Environmental Quality, 10(2):148-153 (6 pages)
YEAR : 1981
TEXT : The operational land treatment system at Unicol State Park near Helen, Georgia, was used for a period of three years to study the role of a mature Appalachian forest in renovating municipal wastewater. Uptake of some of the nutrients in the wastewater was occurring in the vegetation, but no systematic nutrient uptake by any one component of the stand was observed. Overstory trees failed to show any growth response to the irrigation in height or diameter at breast height (dbh), but did show increased stem diameter growth within the canopy. The irrigation was causing significant increases in diameter at 0.3m and height of understory trees. A detailed stem analysis of five treated and five control white pine trees (Pinus strobus L.) from the mature overstory showed that upper stem diameter growth was increased significantly as a result of the irrigation. This stem volume response to wastewater irrigation would not be detected had breast height diameter and total height been the only stem measurements taken. The irrigation is decreasing the biomass, diversity, and the number of individuals of the ground vegetation. (AU)

ACC# : L001034
AUTHOR: Kraus, M.P.
AFFIL : Algal Research Center, Landenberg, PA
TITLE : Evaluation of Toxicities and Environmental Impact in "Symbiotic" Water Reuse Systems
SOURCE: Proceedings of Third National Conference on Complete Water Reuse, Sponsored by American Institute of Chemical Engineers and EPA Technology Transfer, 476-482 (7 Pages)
YEAR : 1976
TEXT : Presents selected data obtained in an extensive survey of virus populations in waste stabilization lagoons and water renovation systems. Discusses various lagooning processes and the action and microorganisms that convert the waste into organic nitrates, phosphates, sulfates and silicates. Also included are the health aspects of these treatment systems, the fate of microorganisms in spray irrigation of domestic sewage onto woodland, sludge disposal on land, sludge disposal at sea, and industrial uses of water and sludge. (SWF)

ACC# : L001035
AUTHOR: Schwab, D., Armstrong, J.H., Harp, S.
AFFIL : Oklahoma State University
TITLE : Septic Tank Maintenance
SOURCE: Oklahoma State University Extension Facts No. 1657 (2 pages)
YEAR : 1975
TEXT : Methods for measuring sludge and scum accumulation in septic tanks are mentioned in a short Extension Service Fact Sheet. Cleaning procedures are given for septic tank systems. Effects of adding various biological and chemical additives to the septic systems are also discussed. (SWF)

ACC# : L001036
AUTHOR: Schwab, D., Armstrong, J.H., Harp, S.
AFFIL : Oklahoma State University
TITLE : Septic Tank Systems for Homes
SOURCE: Oklahoma State University Extension Facts No. 1656 (4 pages)
YEAR : 1975
TEXT : The components of a septic tank-soil absorption system are briefly defined, and Oklahoma State Department of Health septic tank design and capacity requirements are discussed. Location guidelines for the septic tank and seepage field are also mentioned. Procedures and regulations governing the soil percolation test in Oklahoma are included. (SWF)

ACC# : L001037
AUTHOR: Sandhu, S.S., Warren, W.J., Nelson, P.
AFFIL : Water Laboratory, South Carolina State College, Orangeburg, South Carolina
TITLE : Trace Inorganics in Rural Potable Water and Their Correlation to Possible Sources
SOURCE: Water Research, 12(4): 257-261 (5 pages)
YEAR : 1978
TEXT : Ninety-eight water samples, comprising about 10 percent of the total sources available to rural homes in Hampton County, South Carolina, were randomly selected and analyzed for inorganic constituents. Chemical contaminaton is widespread in this area and many people are using substandard quality water.

A noticeable number of water samples showed unacceptable levels of arsenic, iron, manganese and mercury. Iron and collodial material were chiefly responsible for turbidity in 19 percent of the water sources. Acceptable levels of cadmium, chloride, copper, lead, nitrate, phosphate, sodium, total solids and zinc were detected in most of the samples.

Statistical analysis indicated that leachings from septic tanks were at least partially responsible for the contamination of shallow water supply sources with nitrate, phosphate, chloride and arsenic. Iron, lead and manganese appear to have come from corrosion of antiquated plumbing in older homes. (AU)

ACC# : L001038
AUTHOR: Haug, R.T., Haug, L.A.
AFFIL : Regional Wastewater Solids Management Program, LA/OMA Project, P.O. Box 4998, Whittier, CA 90607
TITLE : Sludge Composting: A Discussion of Engineering Principles--Part II
SOURCE: Compost Science/Land Utilization, 19(1): 10-14 (5 pages)
YEAR : 1978
TEXT : An analysis of basic principles and criteria governing the operation of the aerated pile and other composting methods is discussed in mathematical terms that engineers can use to evaluate varying conditions. Thermodynamic considerations, composting energy budget and the effect of amendment addition are presented in this second part. (SWF)

ACC# : L001039
AUTHOR: Teltsch, B., Shuval, H.I., Tadmor, J.
AFFIL : Division of Human Environmental Sciences, School of Applied Science and Technology, the Hebrew University, Jerusalem, Israel
TITLE : Die-Away Kinetics of Aerosolized Bacteria from Sprinkler Application of Wastewater
SOURCE: Applied and Environmental Microbiology, 39(6): 1191-1197 (7 pages)
YEAR : 1980
TEXT : A methodology for estimating the microbial die-away constant under field conditions is presented. This constant may be used in predicting the aerosolized pathogenic microorganism concentrations downwind from wastewater spray or aeration sites by means of modified atmospheric diffusion equations. Validation of the developed diffusion model was proven under field conditions, considering the following key biological decay parameters: temperature, solar radiation, and relative humidity. (AU/SWF)

ACC# : L001040
AUTHOR: Abeliovich, A.
AFFIL : Environmental Health Library, The Hebrew University of Jerusalem, Jerusalem, Israel
TITLE : Operation of a Deep, Well-Mixed, High Rate Photosynthetic Oxidation Pond
SOURCE: Water Research, 13(8): 281-283 (3 pages)
YEAR : 1979
TEXT : This experiment sought to prevent excessive pH and ammonia concentrations that normally occur in lagoons by deepening the ponds to better balance photosynthesis and respiration. Maximum depth for stable operation was determined to be 90 cm. for photosynthetic, high-rate oxidation ponds. Methods, materials and results are discussed. (AU/SWF)

ACC# : L001041
AUTHOR: Johnson, B., Wight, J.L., Middlebrooks, E.J., Reynolds, J.H., Venosa, A.D.
AFFIL : Forsgren, Perkins, & Associates, Rexburg, Idaho, et al.
TITLE : Mathematical Model for the Disinfection of Waste Stabilization Lagoon
SOURCE: Journal of Water Pollution Control Federation, 50(8): 2002-2015 (14 pages)
YEAR : 1978
TEXT : A mathematical model to predict chlorine doses needed for different disinfection levels as they relate to lagoon effluent quality is presented. Design curves for contact time and chlorine dosage were developed following a twelve-month study of waste stabilization lagoons. (AU)

ACC# : L001042
AUTHOR: Constantine, T.A., Osmond, P.J.
AFFIL : M.M. Dillion Limited
TITLE : Development of Design Guidelines for Shore-Side Holding Tanks
SOURCE: Environment Canada, Economic and Technical Review Report EPS 3-WP-76-2

(55 pages)
YEAR : 1976
TEXT : Requirements of various construction materials and configurations for shore-side holding tanks receiving sewage collected on board vessels are reported. Preliminary designs for a basic system and two variations are developed. Capital and annual O&M cost estimates are prevented for each system variation of the three different tank capacities of 5000, 10,000 and 30,000 imperial gallons. Properly designed holding tank facilities will be very expensive to construct and operate and, if possible, direct transfer of the sewage from the vessel to a shore-side sewer or treatment facility should be undertaken. (AU/SWF)

ACC# : L001043
AUTHOR: Kaufman, H.
AFFIL : Farallones Institute
TITLE : Biogas in China: Small Scale, Decentralized Anaerobic Digestion
SOURCE: Alternative Sources of Energy, 51: 24-27 (4 pages)
YEAR : 1981
TEXT : A biogas production system which produces methane gas, electricity and fertilizer has been used successfully in China. Animal and human wastes and crop residues are fed into digesters consisting of a subsurface, dome-covered digesting chamber and water pressure gas storage tank. The gas drives a generator, producing electricity for lighting and pumping irrigation water. Sludge is applied to farmland as a soil fertilizer and conditioner. The systems are low cost and easy to build from available construction materials. (SWF)

ACC# : L001044
AUTHOR: U.S. EPA
AFFIL : Office of Water Program Operations
TITLE : A Strategy for Small Alternative Wastewater Systems (SAWS)
SOURCE: U.S. EPA Office of Water Program Operations (45 pages)
YEAR : 1980
TEXT : The development of a comprehensive planning and management approach to promote the use of, and improve the performance of, small alternative wastewater systems (SAWS) is discussed in this four-section report. The strategy for improving SAWS management is outlined with regard to educational programs, state program management, construction grant program management, research, etc. Current federal, state and local SAWS programs, problems and issues inhibiting implementation of adequate SAWS management programs, and recommendations to improve program management are discussed. (SWF)

ACC# : L001045
AUTHOR: Overman, A.R.
AFFIL : Associate Professors of Agricultural Engineering, University of Florida, Gainesville
TITLE : Effluent Irrigation of Different Frequencies
SOURCE: Journal of the Environmental Engineering Division, June 1979: 535-545 (11 pages)
YEAR : 1979
TEXT : This paper evaluates the effect of both rate and frequency of irrigation on the yield and composition of sorghum-sudangrass and corn for grain and silage. Experiments were conducted to compare the effect of slit application versus single weekly applications of wastewaters. Parameters included yields, dry matter content, nutrient content and nutrient uptake. Secondary effluent from a trickling filter plant was applied at rates of 2, 4, 6, and 8 inches per week by sprinkler systems to the test plots. All three crops showed positive response to effluent irrigation. Yields and nutrient uptake increased with irrigation rate, while dry matter content and nutrient content were independent of irrigation rate. Although effluent irrigation offers potential for crop production, its dilute form of nutrients appears to provide lower nitrogen uptake than commercial fertilizer, particularly on the sandy Lakeland soil with low fertility and low water holding capacity. (SWF)

ACC# : L001046
AUTHOR: Graham, H.J., Hunsinger, R.B.
AFFIL : Ontario Ministry of the Environment
TITLE : Phosphorus Removal in Seasonal Retention Lagoons by Batch Chemical Precipitation
SOURCE: Environment Canada, Research Report No. 13 (50 pages)
YEAR :
TEXT : Batch chemical treatment of seasonal retention lagoons to achieve total phosphorus residuals of less than 1 ppm were studied. Three prime coagulants (alum, ferric chloride and lime) were field tested. Outboard motor boats were used to disperse and mix the coagulants. Though all three coagulants achieved less than 1 ppm total phosphorus residuals in the effluent, liquid alum seemed to work best. Other advantages cited

included reductions in effluent BOD, SS, and algae levels, with only a slight increase in sediment depth with each batch treatment. (SWF)

ACC# : L001047
AUTHOR: Given, P.W., Smith, D.W.
AFFIL : Northern Technology Centre, Water Pollution Control Directorate, Environmental Protection Service, Fisheries and Environment Canada
TITLE : Critical Evaluation of Extended Aeration Systems in Arctic and Subarctic Regions
SOURCE: Fisheries and Environment Canada, Economic and Technical Review Report EPS 3-WP-77-10 (85 pages)
YEAR : 1977
TEXT : This study was undertaken to summarize available information from previously published and unpublished sources pertaining to the failure and success of extended aeration plants in northern North America. For comparison, plants were placed into two major categories: 1) northern (above the mean annual 0 degree Celsius isotherm), and 2) non-northern (below the mean annual 0 degree Celsius isotherm). An extensive literature review relating to extended aeration plant characteristics is given. Results showed northern plants to perform significantly worse than non-northern, and reasons for this difference are discussed. Less conscientious, and skilled operation was the general problem. Much information is presented graphically, illustrating plant influent-effluent conditions and BOD, COD and SS removal probabilities. An abbreviated case study for each of the 66 extended aeration plants cited is given in a table. (SWF)

ACC# : L001048
AUTHOR: N/A
AFFIL : Pollutech Pollution Advisory Services, Ltd., Oakville, Ontario
TITLE : Nutrient Control in Sewage Lagoons - Volume II
SOURCE: Environment Canada, Research Report No. 28 (64 pages)
YEAR : 1975
TEXT : An investigation studied the effects of physical and chemical conditions and chemical addition on the operation of sewage lagoons and the removal of phosphorus. Laboratory lagoon simulators were used to evaluate the effects of temperature, chemical dosage and influent phosphorus concentration on the performance of a typical lagoon. Results showed that a dose of 200 ppm of alum effectively reduced new sewage phosphorus levels to less than 1 ppm. The study also considered the application of a computer model to simulate chemically treated lagoon reactions, but the complexity of the chemical reactions caused unrealistic predictions of phosphorus precipitation and the model was abandoned. (AU/SWF)

ACC# : L001049
AUTHOR: Nelson, B.N.
AFFIL : Pueblo Regional Planning Commission, Pueblo, Colorado
TITLE : Pueblo Area Council of Government's Pueblo County Septic Tank Maintenance Demonstration Project-Progress Report 1979 and 1980.
SOURCE: Pueblo Regional Planning Commission, Pueblo, Colorado (32 pages)
YEAR : 1981
TEXT : This second year progress report describes work accomplished during the first two years of activity (1979-80) on a septic tank maintenance project. The goals of central management were the basis for this St. Charles Mesa area demonstration project. Results and findings of completed work include homeowner septic system descriptions (i.e., failure rate, age, home characteristics), sludge depth accumulation rates, problems and difficulties of field and management opertions, groundwater monitoring program results and economic considerations. Examples of survey forms are included. (SWF)

ACC# : L001050
AUTHOR: Shelef, G., Ronen, M., Kremer, M.
AFFIL : Dept. of Environmental Engineering, Technion-Israel, Institute of Technology, Haifa, Israel
TITLE : Wastewater Recirculation Ponds - Pilot Plant and Field Studies
SOURCE: Progress in Water Technology 9(3): 645-657 (13 pages)
YEAR : 1977
TEXT : Recirculation of effluent from final ponds in a sequence of stabilization ponds into the first ponds was used first in South Africa, New Zealand and Israel as an emergency action in cases where a series of anaerobic-facultative-aerobic pond systems became overloaded and produced malodors. Such recirculation eliminated anaerobiosis at the surface of the ponds and increased ponds performance. Later, recirculation ponds systems were predesigned and operated as a process by itself, notably the "cartwheel" system at Cape Flats, S.A. and the "half orange" at the Dan Region (Greater Tel-Aviv), Israel.

Pilot plant studies at the Technion in Haifa and field studies at the Dan Region Wastewater Treatment and Reclamation scheme showed some of the basic parameters of the recirculation ponds system. A recirculation ratio of between 1.8 to 2.5 was found to give the best results as far as hydrogen sulfide control and BOD removal are concerned. BOD-5 loadings of about 400 kg/ha-day on the first pond and 180 kg/ha-day on the entire system proved applicable. The effect of recirculation in increasing surface layer dissolved oxygen levels and in reducing algae predator activity at the first ponds in the sequence is shown. The concentration of algae in the various ponds at different seasons was measured. (AU)

ACC# : L001051
AUTHOR: Fulton, N.
AFFIL : Assistant City Manager, City of Elmhurst, Illinois
TITLE : How Elmhurst Cut Water Use by 15%, Increased Existing Sewage Capacity by 4,800 People and Saved Itself $400,000 in the Bargain
SOURCE: Innovations, 2(2): 6-13 (5 pages)
YEAR : 1978
TEXT : Discusses how a city of 50,000 reduced water consumption by 15 percent through consumer education, modification of plumbing codes requiring use of water-saving devices in new and replacement plumbing installations and retrofitting existing toilets with displacement dams. (SWF)

ACC# : L001052
AUTHOR: Capobianco, J.A., Mudroch, A.
AFFIL : Canada Centre for Inland Waters, Burlington, Ontario
TITLE : Effects of Treated Effluent on a Natural Marsh
SOURCE: Journal of Water Pollution Control, 51(9):2243-2256 (13 pages)
YEAR ; 1979
TEXT : Long-term effects of poor-quality wastewater treatment plant effluent on a natural marsh on the western shore of Lake Ontario were studied. The major contributor of N and P to the marsh area was the treatment plant discharge. Metal concentrations in the water were generally low. Increased concentrations of Pb, Cr, Zn, N, P and organic C were found in the sediment vertical profile obtained from the marsh area. The shoot standing crop of the dominant plant species (Glycerin grandis) was associated with amounts of P, N, and organic C in the sediments. (AU)

ACC# : L001053
AUTHOR: Shine, D.K.
AFFIL : President, AWWA
TITLE : Committee Hears Association Stand to Save Resources
SOURCE: Willing Water, American Water Works Association, 23(9):1-11 (3 pages)
YEAR : 1979
TEXT : The full testimony by American Water Works Association, president D.K. Shine to the U.S. House Government Operations Subcommittee on Environment, Energy and Natural Resources is presented. Shine spoke on water conservation programs that are cropping up nationally because of periodic drought and rising costs. He suggested that programs proceed with caution and noted that some water and energy saving means do not save enough energy and money to be worthwhile. Citing several studies conducted between 1977 and 1979, Shine critiques a number of popular water-savings devices. (SWF)

ACC# : L001054
AUTHOR: Bowne, W.C.
AFFIL : C and G Engineering, Roseburg, Oregon 97470
TITLE : Pressure Sewers
SOURCE: Bowne, W.C., Rt. 3, Box 4032, Roseburg, Oregon 97470 (31 pages)
YEAR : 1979
TEXT : These articles, prepared for the 1978 U.S. EPA Training Sessions on Water Alternatives for Small Communities, provide a general process description of the grinder pump and septic tank effluent pumping pressure systems. Types of pumps, piping materials, air release valves and other appurtenances found in pressure sewer systems are briefly discussed. Operation and maintenance costs associated with pressure sewers, such as administration, billing, wages, power consumption, maintenance and repair are quantified for purposes of producing a monthly user charge for operation and maintenance costs. (SWF)

ACC# : L001055
AUTHOR: NA
AFFIL : The National Association of Home Builders
TITLE : Home Builders and Water Quality
SOURCE: The National Association of Home Builders, 15th and M Streets, N.W. - Washington, DC 20005 (9 pages)
YEAR : 1979
TEXT : This guide describes how the clean water programs of the U.S. Envionmental Protection Agency may affect the home building industry.

The purposes of the manual are to: (1) explain the water quality programs, showing how they affect home builders, and (2) specify the actions builders should take to protect their communities from unreasonable environmental regulation. Many pictures and charts are provided. (SWF)

ACC# : L001056
AUTHOR: Wiuff, P.
AFFIL : Cowiconsult, Consulting Engineers and Planners, Virum, Denmark
TITLE : Distribution of Wastewater to Drain Field Pipes
SOURCE: Journal of the Environmental Engineering Division, Proceedings of the American Society of Civil Engineers, 108(EE5):1009-1024 (16 pages)
YEAR : 1981
TEXT : This article addresses the hydraulics of wastewater flow in drain field pipe. Theoretical equations are analyzed and followed by experimental results which define distribution of effluent from the drain pipe. An example is given which illustrates uniform distribution of effluent accomplished by using greater than one percent slope and unevenly spaced holes in the bottom of the drain pipe. (SWF)

ACC# : L001057
AUTHOR: Wert, S.R.
AFFIL : NA
TITLE : Septic Tank Drainfield Performance in Five Williamette Valley Soils
SOURCE: Oregon State University Masters Thesis (107 pages)
YEAR : 1969
TEXT : This thesis, submitted to Oregon State University Soils Department, discusses five Oregon soils which were tested for septic tank drainfield performance. Nine drainfields were used in Williamette Valley. Two forms of infiltration rate testing were used: Public Health Service test (P.H.S.) and the double tube method. The double tube method was more reliable. Conclusions were made about: permeability in different soil horizons and its effects on drainfield performance, effects of age on drainfield performance, and effects of the water table on drainfield performance. Charts and tables are provided. (SWF)

ACC# : L001058
AUTHOR: Van de Graaff, R.H.M., Brouwer, J., Willatt, S.T.
AFFIL : Soil Conservation Authority, Victoria, State Rivers and Water Supply Commission, Victoria, School of Agriculture, La Trobe University, Victoria
TITLE : Septic Tanks Revisited. . .Success or Failure of On-Site Effluent Disposal
SOURCE: The Australian Health Surveyor, 12(1): (5 pages)
YEAR : 1980
TEXT : In Victoria, Australia, on-site disposal of domestic septic tank effluent by ground absorption is a widespread practice in unsewered areas. This article considers the results of research carried out on three existing effluent absorption fields. The authors explain the role of hydraulic conductivity in soil and the use of tensiometers for measuring the magnitude of soil water suction. Data were used to evaluate actual soil disposal performance at three residences with different waste loadings and site conditions. From this, generalized conclusions were drawn on reasons for absorption field failures. (SWF)

ACC# : L001059
AUTHOR: Stowell, R., Ludwig, R., Colt, J., Tchobanoglous, G.
AFFIL : Dewante and Stowell Consulting Engineers, Sacramento, California and Dept. of Engineering, University of California, Davis, California
TITLE : Concepts in Aquatic Treatment Systems Design
SOURCE: Proceedings of the American Society of Civil Engineers, Journal of the Environmental Engineering Division, 197(EE5):919-940 (22 pages)
YEAR : 1981
TEXT : Article defines aquatreatment systems and gives their energy utilization in comparison with an activated sludge plant. Characteristics of more common plants used in this process are described. Design consideration for the aquatic process unit include plant harvesting, climatic influences, environmental factors, wastewater characteristics, process reliability, BOD removal rates, nitrogen removal, phosphorus removal and other contaminants. (SWF)

ACC# : L001060
AUTHOR: Muttamara, S., Wattayakorn, G.
AFFIL : Asian Institute of Technology, Bangkok, Thailand
TITLE : Optimization of Sewage Treatment and Fish Propagation in Ponds
SOURCE: International Conference on Water Pollution Control in Developing Countries (11 pages)
YEAR : 1978

TEXT : Utilization of oxidation ponds for wastewater treatment in developing countries provides two benefits - sufficient treatment of domestic wastes and effluent suitable for use in commercial fish production. This treatment process combines low cost construction with sample operation and maintenance. BOD removal efficiency of 81 percent was obtained during this study. Diluted algal pond effluent (50 and 33 percent) provided an optimum environment for growth of king fish (tilapia) and carp. An economic analysis of this system showed greatly reduced operating costs and a potential financial profit to the community. (SWF)

ACC# : L001061
AUTHOR: Siegrist, R.
AFFIL : Department of Civil and Environmental Engineering, Small Scale Waste Management Project, University of Wisconsin-Madison
TITLE : Residential Waste Flow Reduction with Low-Flush Toilet Fixtures
SOURCE: Third Northwest On-Site Wastewater Disposal Short Course, March 4-5, 1980, University of Washington, Seattle, Washington, p. 170-190 (21 pages)
YEAR : 1980
TEXT : An interim report on a Wisconsin field study of low flush toilets. Results include water savings, water quality changes, O&M requirements, user reaction and cost. A cursory cost analysis considers savings due to reduced pumping cost (for a residence with a holding tank), reduced leachfield repair (for a residence with an overloaded failing leachfield) and reduced leachfield size (for a new installation). (SWF)

ACC# : L001062
AUTHOR: Stuth, W.L.
AFFIL : Manufacturer and designer of septic systems, King County, Washington
TITLE : Tips on How to Survive in This Industry
SOURCE: Third Northwest On-Site Wastewater Disposal Short Course, March 4-5, 1980, University of Washington, Seattle, Washington, p. 273-280 (8 pages)
YEAR : 1980
TEXT : Provides common sense design of a lift station for an upgrade leachfield and trench installation from an installer's point of view. Author stresses need for understanding of the system design and being sure it will work prior to bidding on its installation. Any discrepancies should be addressed by the Health Department and the designer to the satisfaction of the installer prior to installation. (SWF)

ACC# : L001063
AUTHOR: Harkin, J.M.
AFFIL : Soil Science and Water Resources Center, Small Scale Waste Management Project, University of Wisconsin, Madison
TITLE : Hydrogen Peroxide Treatment Update
SOURCE: Third Northwest On-Site Wastewater Disposal Short Course, March 4-5, 1980, University of Washington, Seattle, Washington, p. 309-334 (26 pages)
YEAR : 1980
TEXT : Describes experience with hydrogen peroxide treatment for restoring clogged leachfields. Includes a description of common septic tank or treatment system failures that lead to leachfield failure. Research results on preventing loss in void volume within the leachfield due to an ineffective gravel/soil barrier at the top of the gravel are provided. Use of synthetic fabric is recommended and data on the performance and cost of the materials is presented. (SWF)

ACC# : L001064
AUTHOR: Kennedy, J.
AFFIL : Washington State Department of Social and Health Services, Mail Stop LD-11, Olympia, Washington 98504
TITLE : The Anaerobic Filter for Domestic Wastewater Treatment: Advantages and Disadvantages
SOURCE: Third Northwest On-Site Wastewater Disposal Short Course, March 4-5, 1980, University of Washington, Seattle, Washington, p. 257-270 (15 pages)
YEAR : 1980
TEXT : Describes research on the performance of anaerobic filters applied to domestic wastewater. Although not statistically different in performance from a septic tank (due to highly variable and limited data for both systems) the system has the potential for increased treatment. Figures for a variety of system designs and a list of references are included. (SWF)

ACC# : L001065

AUTHOR: DeWalle, F.B., Kalman, D.A., Norman, D., Sung, J., Plews, G.D.
AFFIL : Department of Environmental Health, University of Washington at Seattle and Department of Social and Health Services, Olympia, Washington
TITLE : Trace Organic Removals in a Large Septic Tank
SOURCE: Third Northwest On-Site Wastewater Disposal Short Course, March 4-5, 1980, University of Washington, Seattle, Washington, p. 238-256 (19 pages)
YEAR : 1980
TEXT : A Washington community septic tank serving a 91-home subdividion was studied to measure the presence of priority pollutants in domestic sewage. The study also evaluated the removal of these compounds in the anaerobic septic tank by analyzing effluent samples collected from a distribution box. The results pertain to the evaluation of the volatile organics in the raw domestic sewage pumped from a large five year old community septic tank. The priority pollutants generally showed higher levels on weekends, probably reflecting leisure activities and related chemicals. Most other volatile compounds were hydrocarbons, and their removal by the septic tank generally decreased with increasing molecular weight. Several organosulfur compounds showed substantial increase as a result of anaerobic degradation processes in the septic tank. (AU/SWF)

ACC# : L001066
AUTHOR: Leich, H.H.
AFFIL : NA
TITLE : Grey Water Separation Gains
SOURCE: Compost Science/Land Utilization, 21(5):18-19 (2 pages)
YEAR : 1980
TEXT : Reviews an on-site sanitation systems manual compiled by the National Environmental Health Association. The manual includes practical information on greywater separation methods. Its purpose is to provide the typical homeowner with information on a variety of alternative wastewater treatment systems available to solve sanitation problems. Includes the address of the association from which the manual can be ordered. (SWF)

ACC# : L001067
AUTHOR: Barror, R.F., Tchobanoglous, G.
AFFIL : Department of Civil Engineering, University of California, Davis, California
TITLE : Effective Wastewater Management Planning for Small Communities - Part 2
SOURCE: Public Works, 111(9):125-130 (6 pages)
YEAR : 1980
TEXT : Discusses the key innovative wastewater management planning concepts for small communities, emphasizing that land and a labor force are two important resources generally given insufficient attention. Two proposed institutional changes, "Centralized Administration/Decentralized Treatment" and "Combined Federal Programs" are recommended for more efficient management and operation. (SWF)

ACC# : L001068
AUTHOR: Barror, R.F., Tchobanoglous, G.
AFFIL : Department of Civil Engineering, University of California, Davis, California
TITLE : Effective Wastewater Management Planning for Small Communities - Part I
SOURCE: Public Works, 111(8):76-80 (5 pages)
YEAR : 1980
TEXT : Wastewater management planning is examined with respect to the federal regulatory process, grants process and the unique planning considerations of small communities. The article discusses the characteristics of small communities such as management, services, and employment, and it explains how the planning considerations can be formulated based on these initial ideas and observations. (SWF)

ACC# : L001069
AUTHOR: Laak, R.
AFFIL : Civil Engineering, University of Connecticut, Storrs, Connecticut
TITLE : Influence of Domestic Wastewater Pretreatment on Soil Clogging
SOURCE: Journal Water Pollution Control Federation, 42(8) Part I:1495-1500 (6 pages)
YEAR : 1970
TEXT : A soil column experiment was designed to determine if the total weight of TSS and BOD-5 applied to the soil was directly related to soil failure or ultimate clogging. Half of the columns were loaded with septic tank effluent and the other half with extended aeration plant effluent. Results showed that TSS removal differed between the two systems, indicating that BOD-5 could be a contributing parameter in clogging. Analysis of the clogging material showed that it did not contain sufficient amounts of ferrous sulfide to be considered a major clogging component, as was previously thought. The experiment concluded

that increasing the pretreatment of domestic wastewater prior to soil application increases the service time of the soil surface. (SWF)

ACC# : L001070
AUTHOR: NA
AFFIL : NA
TITLE : Affluent Effluent: New Choices in Wastewater Treatment (Film)
SOURCE: Water Films, 30 Bates Road, Watertown, MA 02172
YEAR : 1981
TEXT : Innovative and alternative wastewater treatment methods suitable for community use are examined in this 40-minute color film available in 16 mm and in 3/4" video cassette. The film is accompanied by a 28 page handbook describing the case studies of the 17 communities interviewed. Community leachfields, land application and aquaculture are among the options, which when implemented in the communities can save money, energy and resources. This film is available for rental or purchase from Water Films. (SWF)

ACC# : L001071
AUTHOR: Guthrie, R.L., Latshaw, G.J.
AFFIL : NA
TITLE : Soil-Potential Ratings for Septic Tank Absorption Fields in Leon County, Florida
SOURCE: Journal of Soil and Water Conservation, November-December, 1980 278-280 (3 pages)
YEAR : 1980
TEXT : A pilot project was conducted in Leon County, Florida, to test the 1978 Soil Conservation Service policy and procedures for preparing soil potential ratings. Septic tank absorption fields were selected as the land use for which soil potential ratings would be developed. Local contractors who install septic tanks identified corrective measures that they use to overcome soil limitations, while an interdisciplinary soil survey team related these corrective measures to soil map units. The results of this pilot project illustrate the benefits of preparing soil potential ratings at the local level. (SWF)

ACC# : L001072
AUTHOR: Zelazny, L.W., Lietzke, D.A., Barwood, H.L.
AFFIL : Agronomy Department, Virginia Polytechnic Institute and State University
TITLE : Septic Tank Drainfield Failures Resulting from Mineralogical Changes
SOURCE: Virginia Water Resources Reserach Center, Virginia Polytechnic Institute and State University, Blacksburg, Virginia 24060 (118 pages)
YEAR : 1980
TEXT : The purpose of this study was to determine whether or not septic tank drainfield failures in areas containing soils with a high biotite or chloritized vermiculite component could be the result of mineralogical changes that decrease the permeability of the soil at the drainfield interface. Twenty-four drainfields in Virginia counties were examined and in each instance, visible chemical alterations were detected at the soil-drainfield interface. X-ray diffraction of the soils revealed that the primary mode of effluent movement was channelized flow. At no site did the drainfield fail for purely mineralogical reasons. (AU)

ACC# : L001073
AUTHOR: Jones, R.A., Lee, G.F.
AFFIL : Colorado State University, Fort Collins
TITLE : Septic Tank Wastewater Disposal Systems as Phosphorus Sources for Surface Waters
SOURCE: Journal Water Pollution Control Federation, 51(1):2764-2775 (12 pages)
YEAR : 1979
TEXT : Possible ground and surface water contamination resulting from septic tank effluent near Voyage Village, Wisconsin, led to this report. Experimental procedures consisted of the sampling of 21 observation wells to monitor a specified septic tank for 15 parameters, including specific conductance, pH, alkalinity, various ions, soluble orthophosphate, total phosphorus, ammonia, nitrate, turbidity and iron. In addition, pertinent characteristics of the study area examined included climate, soils analyses, site geology, soil phosphorus sorption test, hydrology and groundwater quality. Final results showed that septic tank effluent did migrate from the drainage field into the groundwater region; however, no phosphate transport was found. Article also contains additional discussion of nutrient (P and N) transportation routes from leach fields to ground and surface waters. (SWF)

ACC# : L001074
AUTHOR: Lombardo, P.
AFFIL : Clean Water Project, Town of Woodstock, New York

TITLE : Household Water Conservation: Options, Costs and Savings
SOURCE: Lombardo & Associates, Environmental Engineers/Consultants, 149 Staniford Street, Boston, Massachussetts 02114 (34 pages)
YEAR : 1982
TEXT : A simple step-by-step procedure is explained for the individual to audit his home's current water use and to determine which water saving devices are cost-effective. Devices discussed are low-flow shower heads, flow-control inserts, thermostatic mixing valves, aerators, toilet dams, low-flush toilets; composting toilets, and pressure reducing valves and gauges. (SWF)

ACC# : L001075
AUTHOR: Seabloom, R.W., Engeset, J.
AFFIL : Department of Civil Engineering, University of Washington
TITLE : Mound System - Washington Experience
SOURCE: Third Northwest On-Site Wastewater Disposal Short Course, March 4-5, 1980, University of Washington, Seattle, Washington, p. 53-72 (20 pages)
TEXT : Describes a Wisconsin mound installed on a small lot with tight soils and high groundwater -- conditions unsuitable for a conventional ST-SAS. Performance of the system was evaluated through a year long study of water quality parameters. Data showed that improvement in water quality was so pronounced that the percolating effluent entered the groundwater aquifer with little chance of serious water quality degration. (SWF)

ACC# : L001076
AUTHOR: Tyler, E.J., Converse, J.C., Fredrickson, D.W.
AFFIL : Small Scale Waste Management Project, University of Wisconsin-Madison, and University of Wisconsin-Extension and the Department of Health and Social Services, State of Wisconsin
TITLE : Mound System-Wisconsin Experience
SOURCE: Third Northwest On-Site Wastewater Disposal Short Course, March 4-5, 1980, University of Washington, Seattle, Washington, p. 73-91 (19 pages)
YEAR : 1980
TEXT : Provides a general description of the Wisconsin mound and its application in Wisconsin. Comments include corrections made to failing mounds. (SWF)

ACC# : L001077
AUTHOR: Ronayne, M.
AFFIL : Department of Environmental Quality, State of Oregon, Portland, Oregon
TITLE : Sand Filters: Oregon Experience
SOURCE: Third Northwest On-Site Wastewater Disposal Short Course, March 4-5, 1980, University of Washington, Seattle, Washington, p. 92-98 (7 pages)
YEAR : 1980
TEXT : Discusses experiences in Oregon with the intermittent sand filter, recirculating sand filter and intermittent recirculating sand filter. Design performance and O&M requirements of each system are defined. The intermittent recirculating sand filter produced excellent quality effluent, but it had a short life span of approximately two years. Effectiveness of the intermittent sand filter varied with dosing rate. (SWF)

ACC# : L001078
AUTHOR: Reed, S.C., Bastian, R.K.
AFFIL : USA/CRREL and EPA/OWPO
TITLE : Aquaculture Systems for Wastewater Treatment - An Engineering Assessment
SOURCE: US-EPA, Office of Water Program Operations (133 pages)
YEAR : 1980
TEXT : This publication contains the results of an effort to assess the current status of aquaculture technologies for wastewater treatment. The assessment includes an overview and individual engineering evaluations covering various wastewater aquaculture systems involving wetlands processes, aquatic plant processes and combined aquatic processes. (SWF)

ACC# : L001079
AUTHOR: Magara, Y., Sugito, D., Yagome, K.
AFFIL : The Institute of Public Health and Department of Environmental Sanitation, Ministry of Health and Welfare, Tokyo; Japan Environmental Sanitation Center, Kawasaki
TITLE : Design and Performance of Night Soil Treatment Plants
SOURCE: Journal Water Pollution Control, 52(5):914-922 (9 pages)
YEAR : 1980
TEXT : Collected night soil treatment plants in Japan processed approximately 75 percent of the total collected night soil produced in Japan in 1970.

Anaerobic and aerobic digestion and activated sludge processes are the predominant treatment methods, and under proper operation they can yield effluents which meet water quality standards for BOD, suspended solids and coliform number. Advanced collected night soil treatment processes designed to increase effluent quality are discussed with emphasis placed on the biological denitrification process for waste treatment. (SWF)

ACC# : L001080
AUTHOR: Ross, S.A., Guo, P.H.M., Jank, B.E.
AFFIL : Water Pollution Control Directorate, Environmental Protection Service, Environment Canada
TITLE : Design and Selection of Small Wastewater Treatment Systems
SOURCE: Water Pollution Control Directorate, Environmental Protection Service, Environment Canada (312 pages)
YEAR : 1980
TEXT : This comprehensive report provides general information on the design and selection of wastewater systems with capacitites for populations up to 2,500. Material covered includes: measurement and estimtion of wastewater flows; physical, chemical and biological characteristics of domestic wastewater; on-site wastewater treatment and disposal processes; central wastewater collection and treatment systems; operating problems associated with small treatment systems; disposal of liquid effluents and waste sludges; Canadian regulatory agency requirements; and procedures employed in the selection and approval of wastewater systems. General cost figures and schematic diagrams are presented for most topics discussed. A case history is provided to illustrate the design and selection procedures discussed. (AU/SWF)

ACC# : L001081
AUTHOR: Lehr, J.H.
AFFIL : National Water Well Association, Ann Arbor, Michigan
TITLE : The Fabulous Powers of Mother Earth to Injest, Digest and Avoid Stomach Distress
SOURCE: Individual Onsite Wastewater Systems - Proceeding of the Eighth National Conference, 1981, Ann Arbor, Michigan (19 pages)
YEAR : 1982
TEXT : Three systems of land application of wastewater are reviewed: slow rate, rapid infiltration, and overland flow. Objectives, design features and public health efforts are outlined for each method. Proper site selection is emphasized with guidelines provided for each type of system. (SWF)

ACC# : L001082
AUTHOR: Long, J.H.
AFFIL : Michigan Department of Public Health, Lansing, Michigan
TITLE : Experiences with Site Modifying Sewage Disposal Systems at Single and Two Family Homes
SOURCE: The Michigan Environmental Health Association, Michigan (19 pages)
YEAR : 1978
TEXT : This survey of alternative methods of land application of wastewater in use at one and two-family homesites considered four on-site treatment methods: enlarged, fill, deep-cut, and lagoon systems. The purpose of the evaluations was to determine what designs have been used for sewage disposal and how the various designs have functioned. Causes of failing systems and failure rates are listed for each method under differing soil permeability and water table conditions. (SWF)

ACC# : L001083
AUTHOR: Feigin, A., Feigenbaum, S., Limoni, H.,
AFFIL : Institute of Soils and Water, A.R.O.
TITLE : Utilization Efficiency of Nitrogen from Sewage Effluent and Fertilizer Applied to Corn Plants Growing in a Clay Soil
SOURCE: Journal of Environmental Quality, 10(2):284-287 (4 pages)
YEAR : 1981
TEXT : A greenhouse study of corn plants grown on a clay soil was conducted to determine the fate of nitrogen following sewage effluent irrigation. Ammonia nitrogen was added to the test soil as a solid fertilizer, as sewage effluent, and as a mineral solution. Forty-three days after seeding, the crop was harvested and nitrogen content was traced using a nitrogen isotope. Estimates are given for the nitrogen taken up by the plants, immobilized in the soil, and denitrified or volatilized due to simultaneous application of carbon and nitrogen in the sewage effluent. (SWF)

ACC# : L001084
AUTHOR: Graham, N.
AFFIL : Cowlitz County, Kelso, Washington
TITLE : Public Works Approach to Management of Rural Water and Sewer Systems

SOURCE: Individual Onsite Wastewater Systems - Proceedings of the Eighth National Conference, October 20-22, 1981, Ann Arbor, Michigan, (30 pages)
YEAR : 1982
TEXT : Cowlitz County, Washington, now operates six satellite water and sewer systems which serve 2,000 rural residents. A public works approach is taken to manage this system efficiently. The organization, financing, construction, operation, and maintenance of the system using this approach is presented. The expansion of this approach to onsite wastewater system management is discussed. (SWF)

ACC# : L001085
AUTHOR: Simmons, J.D., Newman, J.D., Rose, C.W., Jones, E.E.
AFFIL : U.S. Department of Agriculture, Agricultural Research Service, Rural Housing Research Unit, P.O. Box 792, Clemson, South Carolina 29633-0792 and Farmers Home Administration, USDA, Washington, DC 20250
TITLE : Small-Diameter, Variable-Grade, Gravity Sewers for Septic Tank Effluent
SOURCE: ASAE, December, 1981 (16 pages)
YEAR : 1981
TEXT : Defines the design and operation of a small-diameter, variable grade effluent sewer installed at Mt. Andrews, Alabama. Figures are included which describe components of this installation along with recommendations for future installation. The system, which consists of modified septic tanks, small-diameter PVC transport lines and a lagoon for final treatment, has operated satisfactorily for more than five years with continually flooded lines running uphill with a net positive hydraulic grade. The line was installed, with the help of the residents, for $2 per foot (1975). Procedures and an example design are included. (SWF)

ACC# : L001086
AUTHOR: Nelson, B.
AFFIL : Pueblo Regional Planning Commission, Pueblo, Colorado
TITLE : The Homeowner's Guide to Septic Tanks
SOURCE: Pueblo Area Council of Governments, Pueblo, Colorado (16 pages)
YEAR : 1981
TEXT : A short, easy to understand guide on the operation and maintenance of a home septic tank. Also includes a brief description of a septic tank maintenance program initiated in 1979 by the Pueblo Regional Planning Commission of Pueblo, Colorado. (SWF)

ACC# : L001087
AUTHOR: NA
AFFIL : NA
TITLE : Texas Year-Round Hyacinth Treatment Study
SOURCE: Water Reuse Highlights, AWWA, January, 1978:15-16 (2 pages)
YEAR : 1978
TEXT : Wastewater treatment utilizing a covered water hyacinth system has been studied at an Austin, Texas, experimental facility. Reductions in suspended solids, BOD and minerals were obtained during treatment of stabilization pond effluent. The protective cover provides year-round plant growth and treatment at a minimum of maintenance and energy. (SWF)

ACC# : L001088
AUTHOR: Dix, S.P.
AFFIL : EPA Small Wastewater Flows Clearinghouse, 258 Stewart Street, Morgantown, WV 26506
TITLE : Siting and Sizing Leach Field in Larimer County
SOURCE: Individual Onsite Wastewater Systems - Proceedings of the Seventh National Conference 1980, Ann Arbor, Michigan, p. 9-19 (11 pages)
YEAR : 1981
TEXT : Part one concerns the procedures followed in Larimer County, Colorado, for site review of onsite wastewater treatment systems for planned subdivisions and individual homes. Site inspection and review by a staff environmental engineer is stressed as necessary to the review process. Management requirements for onsite systems are discussed with respect to working with the homeowner after installation. Part two concerns the development of a new sizing equation for soil absorption systems. The equation works within the limitation of a percolation test and size requirements required under Colorado law. The equation may be used for modified design associated with wastewater flow reduction or evapotranspiration. (SWF)

ACC# : L001089
AUTHOR: McDonald, R.C., Wolverton, B.C.
AFFIL ; National Aeronautics and Space Administration, National Space Technology Laboratories, NSTL Station, Mississippi

TITLE : Comparative Study of Wastewater Lagoon with and without Water Hyacinth
SOURCE: Economic Botany, 34(2):101-110 (10 pages)
YEAR : 1980
TEXT : A three-year study was conducted on an existing, one-cell facultative sewage lagoon having a total surface area of 3.6 ha and receiving a BOD-5 loading rate of 44 kg/ha/d (40lb/a/d). The comparative experimental periods ran from July through November for three consecutive years. During the first period, water hyacinths completely covered the lagoon. The water hyacinth coverage was reduced by 33 percent of the total surface area the second year. The lagoon, free of all vascular aquatic plants the third year, was monitored for comparative purposes. The most significnat improvement overall in the effluent quality occurred when water hyacinths covered the entire lagoon. During this period the effluent BOD-5 and TSS were 23 and 6 mg/l, respectively. Without water hyacinths, the effluent BOD-5 and TSS were 52 and 77 mg/l, respectively. The effluent total organic carbon concentration with water hyacinths averaged 40 mg/l, and without water hyacinths, 72 mg/l. A discussion of the results from this three-year study is presented in this paper along with associated problems that were observed when water hyacinths were introduced into the lagoon and altered its behavior from that of a normal facultative lagoon. (AU)

ACC# : L001090
AUTHOR: Klink, K.R., Pirrung, D.F.
AFFIL : Donohue and Associates, Inc., Sheboygan, Wisconsin
TITLE : Cost-Effectiveness Analysis for On-Site Wastewater Treatment Alternatives
SOURCE: Public Works, January 1982, 51-54 (4 pages)
YEAR : 1982
TEXT : Five on-site wastewater treatment alternatives were evaluated based on economics, practicality and environmental impact: conventional septic systems, holding tanks, sanitary sewer service, individual mound systems and cluster mound systems. Design and financial considerations for these systems are presented. Present worth values were calculated using 1981 figures for most counties in Wisconsin. Septic tank systems were found to be least expensive; individual mounds and holding tanks cost about 2.5 and 8 times more than septic systems, respectively; cluster mounds and sewer costs depend on the length of line and number of homes in the vicinity; and sewers generally cost less than a cluster mound, with both costing less than holding tanks. A graph, which illustrated its cost-effectiveness of the various alternatives in terms of present worth cost per home, serves as a useful guide in preliminary screening of wastewater treatment alternatives for a number of homes in a particular vicinity. (SWF)

ACC# : L001091
AUTHOR: Galegar, W.C., Harlin, C.C., Enfield, C.G.
AFFIL : US-EPA, Robert S. Kerr Environmental Research Laboratory, Ada, Oklahoma
TITLE : Drainage Requirements for Land Application Wastewater Treatment
SOURCE: Transactions of the ASCE, 23(2):343-350 (4 pages)
YEAR : 1980
TEXT : Drainage requirements for land application wastewater treatment are discussed based on the mode of treatment: slow rate (irrigation), rapid infiltration, or overland flow. Drainage patterns for each system are illustrated. Importance of subsurface drainage for slow rate and rapid infiltration is stressed in a discussion of land application effect on height of water table and groundwater quality. (AU/SWF)

ACC# : L001092
AUTHOR: Bouwer, H., Rice, R.C., Lance, J.C., Gilbert, R.G.
AFFIL : U.S. Water Conservation Laboratory, USDA, SEA/AR, Phoenix, Arizona and Science and Education Administration, U.S. Department of Agriculture
TITLE : Rapid Infiltration Systems for Renovating Sewage
SOURCE: Third Northwest On-Site Wastewater Disposal Short Course, March 4-5, 1980, University of Washington, Seattle, Washington, 128-160 (32 pages)
YEAR : 1980
TEXT : Describes design aspects of a rapid-infiltration system. Includes consideration of infiltration and hydraulic loading basin design, groundwater hydraulics and water quality with specific reference to the Flush Meadows Project. Reference to 26 articles and texts provide sources for technical design detail. (SWF)

ACC# : L001093
AUTHOR: Machmeier, R.
AFFIL : Extension Agricultural Engineer, University of Minnesota
TITLE : How to Run a Percolation Test
SOURCE: Land & Water, February/March, (3 pages)
YEAR : 1981

TEXT : Details a step-by-step procedure of how to run a percolation test. Diagrams are used to illustrate actual on-site setup of testing apparatus. Example calculations are given to demonstrate reduction of field data to a percolation rate, and rather than determining the length of trench required, a method of calculating the trench bottom area is presented. (SWF)

ACC# : L001094
AUTHOR: Carlile, B.L.
AFFIL : Extension Soil Specialist, North Carolina State University, Raleigh, North Carolina 27650
TITLE : Effluent Distribution and the Significance to System Performance
SOURCE: Individual Onsite Wastewater Systems - Proceedings of the Seventh National Conference, 1980, Ann Arbor, Michigan, p. 129-145 (17 pages)
YEAR : 1981
TEXT : Defines and offers alternatives for the conventional distribution system. V-trenches, gravelless distribution (cinder block, large pipe), pressure distribution and spray irrigation are discussed. The authors feel the recognition and acceptance of these systems is necessary to overcome present limitations of conventional options. (SWF)

ACC# : L001095
AUTHOR: Keswick, B.H., Wang, D.S., Gerba, C.P.
AFFIL : Program in Infectious Diseases and Clinical Microbiology, University of Texas Medical School - et al., University of Arizona, Tucson, Arizona
TITLE : The Use of Microorganisms as Ground-Water Tracers: A Review
SOURCE: Ground Water, 20(2):142-149 (8 pages)
YEAR : 1982
TEXT : Discusses the use of microorganisms as groundwater tracers. Chemical tracers do not always reflect the movement of microorganisms. Types of microbial tracers discussed are bacteria, yeasts, spores, animal viruses and bacteriophages. Maximum distance of movement, potential pathogenicity to humans, ease of assay and differentiation from background are considered. (SWF)

ACC# : L001096
AUTHOR: Laak, R., Healy, K.A.
AFFIL : Civil Engineering Department, University of Connecticut, Storrs, Connecticut
TITLE : Design of Leaching Field Systems
SOURCE: Journal of Environmental Health, 38(3):194-197 (4 pages)
YEAR : 1975
TEXT : This article examines the thrae major considerations of designing a soil seepage system: (1) a hydraulically sound system, (2) the biological clogging mat which is developed on the soil surface in the seepage field system, and (3) preservation of the ground and surface water quality. Seasonally high water table or relatively impervious strata may retard the flow and reduce the quantity of wastewater that can be carried away fom the subsurface disposal area. This may require alternative measures, such as raising the field. A mathematical relationship was developed for reducing the required soil interface area, and loading rates for different soil permeabilities were plotted geographically for use in sizing fields. Medium sand and silt with an unsaturated thickness of 1.5 feet were found to remove 30 percent of septic tank effluent phosphate and nitrogen after two years of operation. (SWF)

ACC# : L001097
AUTHOR: Laak, R., Parese, M.A., Costello, R.
AFFIL : Department of Civil Engineering, University of Connecticut
TITLE : Denitrification of Blackwater with Greywater
SOURCE: American Society of Civil Engineers, 107(EE3):581-591 (11 pages)
YEAR : 1981
TEXT : A biological nitrogen removal process developed by the University of Connecticut utilizes greywater to denitrify blackwater. Following primary treatment in separate septic tanks, greywater and blackwater are mixed in an anaerobic rock filter tank where denitrification occurs. The effluent is disposed of in a conventional seepage bed. Nitrogen removal of over 70 percent was attained during a field study in a full scale home system. (SWF)

ACC# : L001098
AUTHOR: Laak, R.
AFFIL : Department of Civil Engineering, University of Connecticut
TITLE : Wastewater Engineering Design for Unsewered Areas
SOURCE: Ann Arbor Science Publishers Inc., P.O. Box 1425, Ann Arbor, Michigan 48106 (187 pages)
YEAR : 1980
TEXT : This design text outlines in detail the required engineering design

steps for on-site wastewater treatment and disposal systems. A variety of designs are presented including septic tanks, lagoons, oxidation ditches, greywater and blackwater systems and aerobic fixed growth filters. Detailed designs of a septic tank with soil absorption system and a biogas generator are included with cost analyses. Subjects briefly discussed include site evaluation, wastewater characteristics, subsurface soil systems and septage disposal. (AU)

ACC# : L001099
AUTHOR: Crates-FJ
AFFIL : Hancor, Inc., Findlay, Ohio 45840
TITLE : Management - A Many Splendored Word
SOURCE: National Sanitation Foundation Onsite Waste Management Conference, 1981, Ann Arbor, Michigan (7 pages)
YEAR : 1980
TEXT : The lack of an unified management program for on-site waste disposal technologies has prevented its full development as a viable technological alternative. On-site technology installers, house builders and developers, sanitarians and homeowners are often not aware of available government funding because of a breakdown of communication with management. The author suggests a management program involving academic engineers, manufacturers, government, home builders and owners, and installers is needed to effectively present on-site technologies in the marketplace. (SWF)

ACC# : L001103
AUTHOR: Yost, J.
AFFIL : Preble County Engineer, Eaton, Ohio
TITLE : Grinder-Pump Pressure-Line Checks Out After Five Years
SOURCE: WATER/Engineering & Management, 128(1):79-80 (2 pages)
YEAR : 1981
TEXT : Article gives an itemized breakdown of cost for an installed grinder pump unit ($1,396). Three categories: equipment design, facility design, and administrative procedures and practices, are discussed in detail with respect to their impact on grinder pump operation and maintenance. A table lists the percent time spent on specific and routine operational maintenance problems: average $40/year household. (SWF)

ACC# : L001101
AUTHOR: Mori, WT
AFFIL : Wastewater Discipline, CH2 M Hill, Bellevue, Washington
TITLE : On-Site Sewage Disposal Systems for Rural Communities
SOURCE: WPCF 1981 Conference, Detroit, Michigan, October 1981 (24 pages)
YEAR : 1981
TEXT : A general method for designing alternative community on-site disposal systems is presented with illustration cases. The design process involves two steps: data collection and detailed design. Guidelines are suggested for both steps. Data collection includes soils evaluation, permeability, depth-to-high water table or impervious material, and topography. Detailed design involves choice of a conventional on-site system or a fill system, design flow estimates, groundwater balance, cutoff drains, tank and drainfield sizing, distribution method, site grading, and phased construction. (SWF)

ACC# : L001102
AUTHOR: Chen, R.L., Patrick, W.H., Jr.
AFFIL : Laboratory for Wetland Soils and Sediments, Center for Wetland Teources, Louisiana State University, Baton Rouge, LA 70803
TITLE : Nitrogen Transformations in a Simulated Overland Flow Wastewater Treatment System
SOURCE: Water Research, 14(8):1041-1046 (6 pages)
YEAR : 1980
TEXT : To a simulated overland flow model, wastewater containing redistributed nitrogen-ammonium was applied to determine the N removal efficiency, transformation rates, and incorporation into the plant-soil system. A low permeability Mhoon silt loam soil was seeded with perennial ryegrass and placed on a four percent slope. Thirty-nine percent of the applied radiolabeled N was recovered, the loss primarily attributed to denitrification. Nitrate formed by nitrification of ammonium in the surface soil mass was denitrified or reduced to organic forms in the reduced zone. Nitrogen loss via denitrification should be used to revise estimated N removal rates, which would increase N loading rates by forty percent because of higher denitrification rates. (SWF)

ACC# : L001103
AUTHOR: NA
AFFIL : Government of the Republic of Botswana, International Development

Research Center (IDRC), Canadian International Development Agency
TITLE : Sanitation in Developing Countries
SOURCE: Proceedings of a workshop on training held in Lobatse, Botswana, 14-20 August 1980 (172 pages)
TEXT : The United Nations has chosen the 1980-1990 decade as the period when special emphasis will be placed on overcoming the lack of adequate water supply and sanitation facilities for large sections of the populations of the less-developed world. Regional meetings were held in two areas of Africa to present information on low-cost technologies and training pl4grams to delegations from throughout the continent. These proceedings include papers presented at the meeting, summaries of the esulting discussions, description of the field visits, resolutions and action plans. (SWF)

ACC# : L001104
AUTHOR: Yeaman, B.
AFFIL : Office of Water Program Operations, U.S. EPA, Washington, DC
TITLE : New Developments in an Old Idea: The Role of Water Conservation in Small Wastewater Systems Operations
SOURCE: Individual Onsite Wastewater Systems - Proceedings of the Eighth Va:ional Sanitation Foundation Conference, 1981, Ann Arbor, MI, (14 jIges)
TEXT : New developments in the area of water conservation are described. Topics discussed with regard to reducing water usage include economic factors, public awareness, legislative incentives, consumer acceptance and data collection. Selected case histories help illustrate the economic and environmental benefits for the consumer and the community. (SWF)

ACC# : L001105
AUTHOR: Anderson, E.L., Pepper, I.L., Kneebone, W.R., Drake, R.J.
AFFIL : Department of Soils, Water, and Engineering, and Department of Plant Sciences, University of Arizona, Tucson
TITLE : Reclamation of Wastewater with a Soil-Turf Filter:--II: Removal of Phosphorus, Boron, Sodium and Chlorine
SOURCE: Journal WPCF, 53(9):1408-1412 (5 pages)
YEAR
TEXT : A laboratory study was conducted to determine the removal of phosphorus, boron, sodium and chlorine from wastewater by a soil-turf filter. Secondary treated effluent was applied at various loading rates to plots of two soil compositions seeded with turfgrass. The leachate was collected and chemically analyzed for the elements. The results indicate that both soil-turf filters were effective in removing phosphorus, boron, sodium and chlorine from wastewater. Groundwater recharge met the federal concentration standards for these elements. (SWF)

ACC# : L001106
AUTHOR: Whelan, B.R., Titamnis, Z.V.
AFFIL : Division of Land Resources Management, CSIRO, Wembley, West Austrialia
TITLE : Daily Chemical Variability of Domestic Septic Tank Effluent
SOURCE: Water, Air, and Soil Pollution, 17(2):131-139 (9 pages0
YEAR
TEXT : Effluent from the septic tanks of five households was sampled for 15 days. Temperature, redox potential, conductivity and biochemical oxygen demand were measured and samples were analyzed for nitrogen, phosphorus, trace elements, Ca, Mg, K, Zu, Zn, Cd, Cr, Pb, Mg and linear alkylate sulphonate. Little daily variation occurred in the effluent between households. The effluent was in a reduced and anaerobic condition with almost all nitrogen and phosphorus occurring in the inorganic form in solution. (AU/SWF)

ACC# : L001107
AUTHOR: Bennett, E.R., Linstedt, K.D.
AFFIL : Department of Civil, Environmental and Architectural Engineering, University of Colorado, Boulder, Colorado
TITLE : Sewage Disposal by Evaporation-Transpiration
SOURCE: US-EPA, Municipal Environmental Research Laboratory, Cincinnati, September, 1978
YEAR : 1978
TEXT : One of the methods for on-site disposal of wastewater from individual homes is by evaporation. Two types of evaporative disposal systems have been investigated in this study: evapotranspiration beds and mechanical evaporation units. Twenty-nine test lysimeters of 0.22 cubic meters volume each were utilized to evalute the effect of design and operational parameters for ET bed. The variables studied were wastewater loading rate, effect of the weather variables of evaporation and rainfall, ET sand size, evaporation rate as a function of the water saturation depth, and the transpiration contribution of surface

vegetation. A design method is presented along with cost data and an analysis of the national application potential of this type of system. The evaporation of wastewater using mechanical systems was studied using a pilot scale unit constructed as part of the project. Two types of evaporation designs were evaluated. Design equations were established for both units. Cost data and analysis of national application potential are also presented. (AU)

ACC# : L001108
AUTHOR: Pano, A., Middlebrooks, E.J.
AFFIL : College of Engineering, Utah State University, Logan, Utah
TITLE : Ammonia and Total Kjeldahl Nitrogen Removal in Aerated Lagoons
SOURCE: Water and Science and Technology, Vol. 14:381-391 (11 pages)
YEAR : 1981
TEXT : The annual and seasonal removal of ammonia and total Kjeldahl nitrogen (TKN) in five aerated lagoons is evaluated. Relationships between the percentage removals of ammonia nitrogen and TKN and the hydraulic loading rates and the reciprocal of the hydraulic detention times are presented. The operating conditions, physical characteristics of the systems and the wastewater characteristics are discussed. Low hydraulic loading rates or long hydraulic detention times are required for effective ammonia nitrogen and TKN removals in aerated lagoons operating in cold climates. (AU/SWF)

ACC# : L001109
AUTHOR: Sidwick-JM
AFFIL : NA
TITLE : Rural Sanitation in Developing Countries
SOURCE: Effluent + Water Treatment Journal, 21(5):210-214 (5 pages)
YEAR : 1981
TEXT : Methods of waste disposal in developing countries are discussed and illustrated in this report issued by the World Bank. These low-cost treatment processes provide adequate waste disposal facilities under those conditions. (SWF)

ACC# : L001110
AUTHOR: Ahmed, R., Schiller, R.
AFFIL : Environmental Systems Division, The Center for the Environment and Man, Inc., 275 Windsor Street, Hartford, Connecticut 06106
TITLE : Nonpoint Source Quantification and Its Role in Lake and Stream Water Quality Planning
SOURCE: Progress in Water Technology, 12:783-801 (19 pages)
YEAR : 1980
TEXT : Identifies a simple model to quantify pollution from nonpoint sources including leachate from septic tank absorption field. Data collected 3rom Lake Waramaug, Connecticut, and its tributaries are used in a comparison to verify the validity of the model. Discussion given on the use of the model to develop cost-effective nonpoint source pollution control and; management plans is presented and illustrated by example. Phosphorus as thought to be the limiting nutrient to nonpoint source water pollution, though the model is applicable to other pollutants, e.g., BOD, SS, nitrogen, coliform, oil & grease, and heavy metals. (AU)

ACC# : L001111
AUTHOR: Baker, L.K.
AFFIL : Weatherby Associates, Inc., Jackson, California 95642
TITLE : The Impact of Water Conservation on Onsite Wastewater Management
SOURCE: Individual Onsite Wastewater Systems - Proceedings of the Seventh National Conference, 1980, p. 61-82 (22 pages)
YEAR : 1981
TEXT : The impact of flow reduction on onsite wastewater management is considered. A discussion of water use and flow reduction is presented; are assessed; and actual application case examples are presented with tables which show comparative savings. Fixtures used in flow reduction were low flush toilets and air-assisted showers. (AU/SWF)

ACC# : L001112
AUTHOR: Olivieri, A.W., Cooper, R.C.
AFFIL : California Water Quality Control Board and School of Public Health, University of California
TITLE : Public Health Evaluation of Onsite Systems
SOURCE: Individual Onsite Wastewater Systems - Proceedings of the Eighth National Sanitation Foundation Conference, 1981, Ann Arbor, MI (22 pages)
YEAR : 1982
TEXT : The public health risk associated with wastewater disposal alternatives is difficult to establish. A probability matrix method of estimating

such risk is presented. An example of the application of the method is given with which the relative health risk of alternative onsite waste disposal systems is estimated. (AU)

ACC# : L001113
AUTHOR: NA
AFFIL : NA
TITLE : Water Hyacinths - Valuable Tertiary Process
SOURCE: Water Resuse Highlights, AWWA, 1978, January 14-15 (2 pages)
YEAR : 1978
TEXT : A two-year study at the National Space Technology Laboratory in Mississippi has examined the use of water hyacinths as a tertiary wastewater treatment system. Results from the Vascular Aquatic Plant Project indicate that a safe effluent for agricultural reuse can be supplements and soil fertilizer are also possible from processed water hyacinths. A diagram of the treatment process is included. (SWF)

ACC# : L001114
AUTHOR: Cameron, J.J., Armstrong, B.C.
AFFIL : Northern Technology Unit, Water Pollution Control Directorate, Enviornmental Protection Service, Environment Canada
TITLE : Water Conservation Alternatives for the North
SOURCE: Environment Canada, Economic and Technical Review, Report EPS 2-WP-80-2 (53 pages)
YEAR : 1980
TEXT : Appropriate and cost-effective water conservation methods and technology can improve the levels of service and sanitation and the economics of providing water and sewage services in northern communities. This e /r4 reviews water use characteristics, pricing policies, plumbing codes, public acceptance, water conservation experiences, and the methods and technology to reduce water use and the concomitant energy requirements. Various administrative alternatives and water conservation technology for toilets, bathing, laundry, kitchen and households are analyzed with respect to appropriateness, public acceptance and cost-effectiveness. Economic analyses and water conservation strategies for both trucked and piped utility systems are plesented. (AU)

ACC# : L001115
AUTHOR: White, R.K., Brown, R.E.
AFFIL : Agricultural Engineering, Ohio State University, Environmental Telations, Ohio Farm Bureau Federation
TITLE : Applying Sludge at Agronomic Rates
SOURCE: BioCycle, 22(1):20-14 (5 pages)
YEAR : 1981
TEXT : Discusses Ohio's methods of sludge application on farmlands. The j og am uses application rates of one to six dry tons per acre as a means of reducing envionmental and nuisance problems. The article discusses the "slurry" and "sludge cake" application system as well as management principles and considerations. (SWF)

ACC# : L001116
AUTHOR: Sobsey, M.D., Dean, C.H., Knuckles, M.E., Wagner, R.A.
AFFIL : Dept. of Environmental Sciences and Engineering, School of Public Pealth, University of North Carolina, Chapel Hill, NC 27514
TITLE : Interactions and Survival of Enteric Viruses in Soil Materials
SOURCE: Applied and Environmental Microbiology, 40(1):92-101 (10 pages)
YEAR : 1980
TEXT : Describes the interactions and survival of representatives of two different enteric virus groups in eight different soil materials in settled sewage. Results show that virus adsorption is rapid, mostly occurring within 15 minutes of application. Clayey soils proved to be the best adsorbents over a range of pH and TDS levels, while sandy soils proved to be poor absorbers for both viruses. However, more adsorption occurred in those sands of higher TDS levels. Virus absorption improved in sandy soils when wastewater was applied intermittently. Simulated rainfall washed retained viruses from the sandy soils but not the clayey soils. (SWF)

ACC# : L001117
AUTHOR: Black, S.A., Wile, I., Miller, G.
AFFIL : Pollution Control Branch, Water Resources Branch, Publications, Ontario, Ministry of the Environment, Toronto, Ontario
TITLE : Sewage Effluent Treatment in an Artificial Marshland
SOURCE: Conference of the Water Pollution Control Federation, Detroit, Michigan, Session 23, October 4-9, 1981
YEAR : 1981
TEXT : An experimental study was conducted to determine the potential of

artificial wetlands as a viable wastewater treatment alternative. An experimental marsh consisting of five separate systems received partially treated effluent from an adjacent sewage lagoon system. The removal of BOD, SS and nutrients was monitored along with effluent qualities of the various systems. Data analyzed after one year of operation suggest that improvement of effluent quality is possible, the degree of improvement being dependent upon various factors including hydraulic loading, retention time, season and system configuration. (SWF)

ACC# : L001118
AUTHOR: Hill, W.F., Walters, D.D.
AFFIL : Engineering and Technical Services, Valley Septic Products, Inc., Getttysburg, PA
TITLE : On-Site System Rehabilitation
SOURCE: Compost Science/Land Utilization, Journal of Water Recycling, 21(5):26-27 (2 pages)
YEAR : 1980
TEXT : The proprietary PCROX treatment method was developed to rejuvenate clogged drainage fields without extension of the existing drainage field or construction of a new field. Septic tank and drainage field pipes distribution box. The hydrogen peroxide solution reacts at the soil-aggregate interface to eliminate the clogged condition. This method has application where space is limited or existing landscaping prohibits the construction of a drainage field extension or a new field. (SWF)

ACC# : L001119
AUTHOR: Cakley, H.R.
AFFIL : Watson Hawksley, Consulting Engineers, High Wycombe, U.K.
TITLE : Operational Experience with Aerated Lagoons
SOURCE: Progress in Water Technology, 12(3):239-242 (4 pages)
YEAR : 1980
TEXT : Discusses operating experience with two simple aerated lagoons. Aerated lagoons in this context incorporate a baffled settling zone and are a form of completely mixed activated sludge plant treating either comminuted unsettled sewage or settled sewage. Some difficulties were experienced during the commissioning period in obtaining adequate settlement in the settling zones, these have been resolved by modifications to the baffle. This form of treatment offers some attraction in relatively low capital cost, but with the penalty of high power consumption and consequently high operating costs. It is suggested that for this reason, lagoons of this nature are best used for short-term temporary or interim works and consequently should be of the simplest possible construction. (AU)

ACC# : L001120
AUTHOR: Magdoff, F.R., Amadon, J.F.
AFFIL : Dept. of Plant and Soil Science, University of Vermont, Burlington, VT
TITLE : Nitrogen Availability from Sewage Sludge
SOURCE: Journal of Environmental Quality, Vol. 9, No. 3, 1980
YEAR : 1980
TEXT : Laboratory and field studies were conducted to assess the nitrogen availability from sewage sludge to crops. Crop yields of corn and hay grown on sludge-amended Hadley soil were greater than yields of crops grown on soil amended with ammonium nitrate. Nitrate recovery in the corn plots revealed that the available nitrogen supplied by the sludge treatments was no greater than that supplied by ammonium nitrate. The increased crop yields on the sludge-amended fields was attributed to increased potassium supply and residual nitrogen effect from treatments of the previous year. Laboratory procedures to determine the potential field mineralization of sludges leading to the ranking of various sludges according to potential available nitrogen contribution to crops are outlined. (SWF)

ACC# : L001121
AUTHOR: Boyle, W.C., Otis, R.J.,
AFFIL : University of Wisconsin, Madison, WI
TITLE : Onsite Alternatives for Treatment and Disposal
SOURCE: Journal of Water Pollution Control Federation, 53(6):733-737 (5 pages)
YEAR : 1981
TEXT : This 1980 literature review of on-site alternatives for treatment and disposal of wastewater discusses onsite treatment, subsurface disposal systems, evaportranspiration, septage management and small community facilities. It includes a 48-article bibliography. (SWF)

ACC# : L001122
AUTHOR: Machmeier, R.E., Moore, J.A.

AFFIL : Extension Agricultrual Engineers, University of Minnesota, St. Paul, Minnesota 55108 and Oregon State University, Corvallis, Oregon 97331
TITLE : Land Treatment of Septage
SOURCE: Individual Onsite Wastewater Systems - Proceedings of the Seventh National Conference 1980, p. 205-219 (15 pages)
YEAR : 1981
TEXT : The effects of land spreading of septage on ground and surface water in Minnesota were studied. Seven test plots with high pollution potential (solution) (soil) ranging from 0.0115 to 0.637 acres, were dosed with various loading rates (either 50 lb/ac/yr or 200 lb/ac/yr) of total Kjeldahl nitrogen (TKN) using intermittent and slug loading frequencies. Samples of septage, soil, soil moisture and groundwater were analyzed for total solids, total volatile solids, chemical oxygen demand, ammonia nitrogen, TKN, conductivity and fecal coliform. An extremely wide variation in septage characteristics, and no detrimental effects on groundwater quality (nitrate-nitrogen level of less than 10 ppm) were found. Sandy soil served as an excellent treatment medium for septage.

ACC# : L001123
AUTHOR: Hendry, G.S., Troth, A.
AFFIL : Microbiology Section, Laboratory Services Branch, Ontario Ministry of the Environment, Resources RD., P.O. Box 213, Rexdale, Ontario M9W 5L1, Canada
TITLE : Some Effects of land Use on Bacteriological Water Quality in a Recreational Lake
SOURCE: Water Research, 16(1):105-112 (8 pages)
YEAR : 1982
TEXT : Describes a study to detect the source of fecal indicator bacteria and the resulting degree of bacteriological water quality impairment of Mississippi Lake, a shallow eutrophic lake in Ontario, Canada. Two consecutive 5-day surveys were performed during late May - early June and late July. Major detectable sources of fecal coliform were cattle watering sites, farms, public beaches, some flooded and substandard septic tanks, inflowing streams and a bird sanctuary. After rainfall, densities of fecal coliforms and fecal streptococci rose about 10-fold to all surface water samples.

Cottagers were surveyed for correlation between swimming habits and disease. The frequency of ear infections was significantly associated with the amount of swimming which meet water management objectives for Ontario. Low densities of fecal indicator bacteria indicate that current regulations of installation and maintenance of septic tanks are being met; however, the presence of ear infections indicate additional control would be advisable. These studies provide the basis for recommendations designed to improve lakewater quality. (AU/SWF)

ACC# : L001124
AUTHOR: Moreau, E.M.
AFFIL : Department of Human Services, Division of Health Engineering, Augusta, Maine
TITLE : Failures--Remedies and Prevention of Subsurface Wastewater Disposal Systems
SOURCE: Individual Onsite Wastewater Systems - Proceedings of the Eighth National Sanitation Foundation Conference, 1981, Ann Arbor, MI, (25 pages)
YEAR : 1981
TEXT : The causes and possible measures to correct malfunctions of subsurface wastewater disposal systems are discussed. A checklist of points to consider when determining the cause of a malfunction include soil conditions, treatment units, water usage, garbage disposal usage and others. The steps are listed in a sequence of investigations that will determine the cause of the system malfunction. (SWF)

ACC# : L001125
AUTHOR: Hamilton, J.
AFFIL : Sanitation Facilities Construction Branch, Indian Health Service, Portland, Oregon
TITLE : Anaerobic Treatment of Septic Tank Effluent
SOURCE: Proceedings of Northwest On-Site Waste Water Disposal Short Course, University of Washington, Departments of Civil Engineering and Environmental Health, p. 99-136 (40 pages)
YEAR : 1976
TEXT : Effluent from an upflow anaerobic rock filter following a typical family septic tank was treated prior to discharge to the leachfield. Results indicate reduction in BOD-5, SS, and COD through the rock filter to be 39 percent, 33 percent and 21 percent, respectively. The anaerobic filters, a trench 17.5 ft. long, 3 ft. wide and 18 in. deep, proved to be an effective and inexpensive means of polishing septic tank effluent, thereby reducing the biological load on the leachfield. (SWF)

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ACC#  : L001126
AUTHOR: Winneberger, J.T.
AFFIL : Septic Tank Systems, Berkeley, California
TITLE : History of Individual Sewage Disposal Systems and the State of the Art
SOURCE: Proceedings of Northwest Onsite Waste Water Short Course, December 8 &
        9, 1976, University of Washington, p. 1-7 (7 pages)
YEAR  : 1976
TEXT  : This brief history of the art of individual sewage disposal design
        presents an entertaining depiction of the development of the technology.

ACC#  : L001127
AUTHOR: Laursen, A.
AFFIL : Tacoma Pierce County Health Department, Tacoma, Washington
TITLE : A Critical Analysis of the Percolation Test
SOURCE: Proceedings of Northwest On-Site Waste Water Disposal Short Course,
        December 8 & 9, 1976, University of Washington, p. 49-52 (4 pages)
YEAR  : 1976
TEXT  : This evaluation of the percolation test considers the pros and cons of
        the test and how it must be integrated with other site evaluation tools.
        (SWF)

ACC#  : L001128
AUTHOR: Vivona, M.A., Herzig, W.
AFFIL : Cahn Engineers, Inc., and Connecticut Department of Environmental
        Protection
TITLE : The Use of Septage Lagoons in New England
SOURCE: Sludge, 3(2):27-32 (5 pages)
YEAR  : 1980
TEXT  : The use of lagoons for disposel of septage in New England, where 30
        percent of households employ septic tanks or cesspools, is described.
        Septage characteristics are compared with those for domestic sewage,
        and basic lagoon design is summarized.  Several methods for determining
        expected septage volume are discussed, and guidelines of the New England
        Interstate Water Pollution Control Commission for Lagoon siting, design
        and operation are listed.  (SWF)

ACC#  : L001129
AUTHOR: McClelland, N.I.
AFFIL : Technical Services, National Sanitation Foundation, Ann Arbor, Michigan
TITLE : NSF Program Relating to Individual Onsite Wastewater Disposal
SOURCE: Proceedings of Northwest On-Site Waste Water Disposal Short Course,
        December 8 & 9, 1976, University of Washington, p. 75-90 (16 pages)
YEAR  : 1976
TEXT  : The vice president for technical services of the National Sanitation
        Foundation describes the NSF program for rating individual on-site
        treatment alternatives to conventional septic tanks.  Seven
        manufacturers' package plants are rated for capacity (in gallons per
        day) and design effluent quality (based on BOD-5 and suspended solids
        content).  Ratings criteria are described and listed in tables.  Future
        plans to study specialized devices and recycling or low water use
        systems are outlined.  (SWF)

ACC#  : L001130
AUTHOR: Ferrara, C.A., Avci, C.B.
AFFIL : Water Resources Program, Department of Civil Engineering, Princeton
        University, New Jersey
TITLE : Nitrogen Dynamics in Waste Stabilization Ponds
SOURCE: Journal Water Pollution Control Federation, 54(4):361-369 (9 pages)
YEAR  : 1982
TEXT  : Researchers study nitrogen transformations and removal mechanisms in a
        waste stabilization pond via a time variable model.  The reasons for
        this study are that nitrogen is a significant contributor to the oxygen
        depletion and eutrophication of receiving waters and, in many cases, may
        become the limiting nutrient for algal growth in stabilization ponds.
        Graphs of time versus concentration of different forms of nitrogen are
        stabilization pond is through sedimentation of organic nitrogen.  The
        mechanism for ammonia removal is shown to be the result of biological
        activity rather than ammonia volatilization.  (AU/SWF)

ACC#  : L001131
AUTHOR: Barror, R.F., Weber, A.S., Tchobanoglous, G.
AFFIL : U.S. Public Health Service, STET and Dept. of Civil Engineering,
        University of California, Davis, California
TITLE : Integrated Planning:  The Key to Implementing Onsite Technology
SOURCE: On-Site Sewage Treatment - Proceedings of the Third National Symposium
        on Individual and Small Community Sewage Treatment 1981, American
        Society of Agricultural Engineers, St. Joseph, Michigan (12 pages)
YEAR  : 1982
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TEXT : Suggests a rational planning approach for non- or partially sewered small communities. A case study shows how this approach fairly evaluates on-site technologies. Identifies key planning considerations and develops an integrated planning approach for small communities, based on a management agency and program. Demonstrates the significance of implementation analysis over cost-effective analysis. (SWF)

ACC# : L001132
AUTHOR: Klink, R.E., Pirrung, D.F., Wintheiser, P.J.
AFFIL : Environmental Engineering Division, Donohue & Associates, Inc., Sheboygan, Wisconsin
TITLE : Cost-Effectiveness Analysis for Various On-Site Wastewater Treatment Alternatives
SOURCE: On-Site Sewage Treatment-Proceedings of the Third National Symposium on Individual and Small Community Sewage Treatment 1981, American Society of Agricultural Engineers, St. Joseph, Michigan (10 pages)
YEAR : 1982
TEXT : Present worth cost information was used to compare community-wide alternative systems. Alternatives included septic systems, individual mound systems, individual holding tanks, cluster-mound systems and sanitary sewer service. Graphs and figures compared the present worth costs per home and the percent of present worth of various components for both 5 and 50 units application of a given alternative. The information may be useful for educating the public about the options and costs for specific alternatives. (SWF)

ACC# : L001133
AUTHOR: Pano, A., Middlebrooks, E.J.
AFFIL : Culp/Wesner/Culp, Denver, Colorado and Department of Agricultural Engineering, Clemson University, Clemson, SC
TITLE : Ammonia Nitrogen Removal in Facultative Wastewater Stabilization Ponds
SOURCE: Journal Water Pollution Control Federation, 54(4):344-351 (8 pages)
YEAR : 1982
TEXT : Three case studies of facultative wastewater stabilization ponds are analyzed for ammonia-nitrogen removal as a function of pH value, temperature pond configuration and theoretical hydraulic detention time. Annual ammonia-N removals above 90 percent are observed. The major part of ammonia-N removal occurs in the primary ponds. Ammonia-N removal increases as the pH value, detention time, and temperature increase. (SWF)

ACC# : L001134
AUTHOR: Ferrara, R.A., Harleman, D.R.F.
AFFIL : Department of Civil Engineering, Princeton University
TITLE : Hydraulic Modeling for Waste Stabilization Ponds
SOURCE: Journal for the Env. Eng. Div., 107(EE4):817-830 (14 pages)
YEAR : 1981
TEXT : A mathematical model and dye tracer studies are used to illustrate the treatment efficiency of various lagoon geometrics and inlet and outlet configurations. Results suggest that treatment efficiency predicted by the completely mixed flow model compares well with that determined by analysis of dye tracer studies. A return flow model which realistically eresents the transport process is developed. (SWF)

ACC# : L001135
AUTHOR: Hill, D.E., Sawhney, B.L.
AFFIL : The Connecticut Agricultural Experiment Station, New Haven, CT
TITLE : Removal of Phosphorus from Waste Water by Soil Under Aerobic and Anaerobic Conditions
SOURCE: Journal of Environmental Quality, 10(3):401-405 (5 pages)
YEAR : 1981
TEXT : Movement of phosphorus (P) under different soil moisture conditions was investigated. Wastewater containing 12 micrograms per ml P was added to an isolated soil block 2-3 times a week for 2.5 years. Analysis of effluent from weep holes at different depths suggests that soil pathways allowed P to enter groundwater before all sorption sites were fully saturated with P. Also, anaerobic conditions caused by a high water regenerates sorption sites. (AU/SWF)

ACC# : L001136
AUTHOR: Demgen, F.
AFFIL : Demgen Aquatic Biology
TITLE : The Marsh/Forest System for Advanced Secondary Treatment
SOURCE: Municipal Wastewater Reuse News, No. 35:14-16 (3 pages)
YEAR : 1980
TEXT : The utilization of marsh and forest ecosystems in conjunction is presented as a low cost, low-energy means of polishing secondary effluents in California. Secondary effluent is fed into an aerated pond

for the production of aquatic organisms and to achieve additional emoval of contaminants. The pond effluent is recirculated through the shallow root zone of a forest plot. The wastewater from the combined system meets discharge standards, and a nutritive effect upon the ecosystems is reported. (SWF)

ACC# : L001137
AUTHOR: Morgan, D.W., Pelosi, P.
AFFIL : Urban Economics, University of California, Santa Barbara, California
TITLE : The Effects of Water Conservation Kits on Water Use
SOURCE: American Water Works Association Journal, 72(3):131-133 (3 pages)
YEAR : 1980
TEXT : During an intense drought in 1977, the city of Oxnard, California, distributed a free household water conservation kit to 600 households. According to a subsequent survey, sixty-three percent of the households installed at least part of the kit which included a water dam to reduce the quantity of water flushed in the toilet, a plastic shower head flow restrictor and a dye to test toilet storage tank leaks. Households that installed the conservation kits had greater average water use, more bathrooms and more water-using appliances than non-installers. Households headed by craftsmen and professionals installed at a slightly higher than average rate, while those headed by equipment operators and laborers installed at lower rates. The total kit reduced water use by slightly more than three percent, enough to pay for itself in a year at winter rates then in effect. (SWF)

ACC# : L001138
AUTHOR: Burgh, J.
TITLE : Saving Water Scenically
SOURCE: Water/Engineering & Management, 129(3):46-47 (2 pages)
YEAR : 1982
TEXT : A wastewater reclamation system is designed to be an integral part of a New Mexico vacation resort. The system provides secondary treatment through a packaged, extended-aeration plant. Effluent is either used for pasture irrigation or passed through pressure filtration and seven landscaped pools in series, which provide further aeration and exposure to sunlight. The reclaimed water is used to irrigate lawns and landscaped areas surrounding the lodge. The system helps conserve the sparse water resources of this arid region. (SWF)

ACC# : L001139
AUTHOR: Olson, J.V., Crites, R.W., Levine, P.E.
AFFIL : Creegan & D'Angelo, San Jose, CA
TITLE : Ground-Water Quality at Rapid Infiltration Site
SOURCE: Journal of the Environmental Engineering Division, EES:885-899 (8 pages)
YEAR : 1980
TEXT : A one-year study on a rapid infiltration site in continuous operation at Hollister, California, for 30 years determined the system's effect on groundwater quality. Local hydrogeology was analyzed by boring logs, and groundwater samples were taken when the groundwater mound was highest. Unchlorinated primary effluent treated at this site showed substantial percentage reductions in COD (93%), BOD (96%), TOC (96%), nitrogen (93%) and fecal coliforms (99+) after percolating through seven meters (22 feet) of unsaturated soil. Longer travel distance would be required for effective phosphorus removal. Trace element removal varied, shallow groundwater concentrations were generally lower than guidelines established for unrestricted irrigation. (AU/SWF)

ACC# : L001140
AUTHOR: Bond, W. J. Collis, G.N.
AFFIL : Department of Soil Science, University of Sydney, Australia
TITLE : Ponded Infiltration Into Simple Soil Systems: 3. The Behavior of Infiltration Rate With Time
SOURCE: Soil Science, 131(6):327-333 (7 pages)
YEAR : 1981
TEXT : The behavior of infiltration rate with time during ponded infiltration into simple soil systems is examined. The apparent linearity of a measured infiltration-time relationship is shown not to be a reliable indicator of steady state. An equation based on Darcy's law, relating the infiltration rate to the total potential gradient in the transmission zone, is derived and experimentally tested. This equation is used to support the following two concepts: 1) steady-state infiltration cannot be expected to be attained in finite time during infiltration into simple soil systems; and 2) saturation and transition zones affect the infiltration rate. (AU/SWF)

ACC# : L001141
AUTHOR: Vann, J.A.

AFFIL : Dixie Electric Cooperative, Union Springs, Alabama
TITLE : Rural Electric Cooperative Management Systems
SOURCE: Individual Onsite Wastewater Systems Proceedings of the Eigth National Conference 1981, National Science Foundation, Ann Arbor, Michigan (17 pages)
Year : 1981
TEXT : A basic, in-place organization structure of a rural electric cooperative is shown to be adaptable to water or wastewater operations. A summary of the responsibilities and functions of each of the departments within this structure is provided. Work order, billing, general accounting, inventory and reporting procedures are justified economically. The author feels that providing watar and wastewater services can be assisted by this management system in one of the following three ways: 1) portions of the management system may be adopted by the utility as standard; 2) a portion of the services required by the water/wastewater owner may be contracted through the rural electric cooperative; and 3) the rural electric cooperative may become a full-service utility encompassing water/wastewater management. (SWF)

ACC# : L001142
AUTHOR: Troyan, J.J.
AFFIL : Brown and Caldwell, Eugene, Oregon
TITLE : Alternative Systems - The Oregon Experience
SOURCE: Proceedings of the Northwest On-Site Waste Water Disposal Short Course, December 8 & 9, 1976, University of Washington, p. 33-37 (5 pages)
YEAR : 1976
TEXT : This is evaluation of alternative sewage treatment and disposal systems for the Oregon Department of Environmental Quality. Available alternatives are classified into non-discharging, discharging or disposal systems. In structures with running water, mechanical oxidation systems and mounded disposal beds are recommended. However, both alternatives were recommended with restrictions. Many other systems were found currently unacceptable due to lack of sufficient long-term objective documentation of reliability. Further development and testing could bring these systems to an acceptable level of reliability. Systems restricted to structures without running water are recycle systems and self-contained toilets. The existence of a public agency with ultimate responsibility for all operation and maintenance of installed units is recommended in all cases. Changes in Oregon's subsurface disposal rules since the completion of this report are included. (SWF)

ACC# : L001143
AUTHOR: Levine, P.E., Crites, R.W., Olson, J.V.
AFFIL : Ecology and Environment, San Francisco, CA
TITLE : Soil Chemistry Changes at Rapid Infiltration Site
SOURCE: Journal of the Environmental Engineering Division, EES:869-883 (8 pages)
YEAR : 1980
TEXT : Reports changes in the chemistry of a calcareous soil produced at a rapid infiltration facility in continuous operation at Hollister, California, for 30 years. Soil pH was decreased significantly and there was significant increase in saturated extract conductivity. Soil organic matter remained nearly constant. Nitrogen accumulation accounted for only two percent of total N applied over the entire period. Although the soil maintained its ability to absorb solution phosphorus, most phosphorus appeared to pass through the soil to the groundwater. Boron increased at the soil surface. Cation exchange capacity and exchangeable sodium, magnesium, and potassium increased. Soil metal concentrations also generally increased. (AU/SWF)

ACC# : L001144
AUTHOR: Frome, M.
TITLE : Rural Sewage Treatment in Vermont - Book 2: A Planning Manual
SOURCE: Vermont Natural Resources Council, Montpelier, Vermont (101 pages)
TEXT : Written for town officials and citizens seeking answers to community sewage treatment problems, this book is organized into study and action steps. In the study steps, towns can look at problems and collect needed information. Through the action steps, towns can act to improve onsite systems, build centralized systems and prevent future problems. Focuses on the special needs of Vermont's unsewered areas. Appendices provide federal, state, regional and state university contacts, along with a list of manufacturers and consulting engineers. (AU/SWF)

ACC# : L001145
AUTHOR: Jebson, R.W.
AFFIL : Environmental Systems Service, Ltd., Culpeper, Virginia

TITLE : Management by Contact
SOURCE: Individual Onsite Wastewater Systems - Proceedings of the Eighth National Sanitation Foundation Conference, 1981, Ann Arbor, Michigan
YEAR : 1981
TEXT : The history and organization of a water and wastewater system operation and maintenance service are described by its founder. Target clients are small municipalities, industrial treatment plants, systems constructed by developers, and systems supporting recreational communities. Services include staffing and overall responsibility for a customer's utility process system and reducing the client's operating costs. Diversified operating teams are assigned to geographical regions, and analytical laboratory work not of immediate concern to the operator is assigned to a central facility. The central laboratory monitors the performance of the operating team. Advantages of this type of business are discussed, and its continued prospects for success, particularly in industrial wastewater treatment are cited. (SWF)

ACC# : L001146
AUTHOR: Stephenson, M., Turner, G., Pope, P., Colt, J., Knight, A., Tchobanoglous, G.
AFFIL : University of California, Davis, CA 95616
TITLE : The Use and Potential of Aquatic Species for Wastewater Treatment: The Envoronmental Requirements of Aquatic Plants
SOURCE: The State Water Resources Control Board publication No. 65, Appendix A, Sacramento, CA (659 pages)
YEAR : 1980
TEXT : This annotated bibliography deals with the environmental requirements of vascular plant species--catagorized as being either emergent, floating, or submerged--having potential for use in wastewater treatment. Presents the effects of physical, chemical, and biological parameters, in addition to the uptake of specific substances by the plants. Yield, composition, and decomposition data are given for each of the species discussed. Indexed by subject and author. (SWF)

ACC# : L001147
AUTHOR: Fritz, W.R., Helle, S.C.
AFFIL : Orlando Regional Office of Boyle Engineering Corporation
TITLE : Cypress Wetlands for Tertiary Treatment
SOURCE: National Science Foundation, (7 pages)
YEAR : 1981
TEXT : Researchers studied the effects of discharging a city's secondary effluent into a large cypress wetland area. There were no significant adverse environmental impacts related to the application of secondary effluent. Although the wetland was very effective at removing nitrates and nitrites, it did not significantly remove the organic or ammonium forms of nitrogen. Consequently, sufficient detention time should be provided in the treatment facility or holding ponds to convert as much of the nitrogen to nitrates as possible before applying the effluent to the wetland. There was no significant removal of phosphorus. Because the concentrations were low, no conclusions could be made regarding the fate of heavy metal inputs to cypress swamps. There was little or no coliform contamination of the groundwater by the sewage-enriched surface waters. (SWF)

ACC# : L001148
AUTHOR: Zulauf, A.
AFFIL : U.S. Soil Conservation Service, Bellevue, Washington
TITLE : Soils - Characteristics, Surveys and Maps
SOURCE: Proceedings Northwest On-Site Waste Water Disposal Short Course, December 8 & 9, 1976, University of Washington, p. 38-48 (11 pages)
YEAR : 1976
TEXT : Discusses the use of soil surveys to make a preliminary determination of site suitability for an onsite disposal system. Brief descriptions of survey components (classification, interpretations and soil maps) enable the user to exclude poorly suited sites and focus onsite investigations on potentially favorable disposal areas. (SWF)

ACC# : 1001149
AUTHOR: Strong, D.R.
AFFIL : U.S. Department of Housing and Urban Development, Seattle, Washington
TITLE : Mound Systems for On-site Waste Water Disposal
SOURCE: Proceedings of Northwest On-Site Waste Water Disposal Short Course, University of Washington, Departments of Civil Engineering and Environmental Health, p. 92-98 (7 pages)
YEAR : 1976
TEXT : Gives a detailed description of a mound system. Provides construction sequence and design with illustrations. (SWF)

ACC# : L001150
AUTHOR: Seabloom, R.W.,
AFFIL : Civil Engineering, University of Washington, Seattle, Washington
TITLE : Soils Capabilities in Waste Water Renovation
SOURCE:
YEAR : 1976
TEXT : Discusses the effect of soil properties on septic tank absorption system removal of bacteria, viruses, nitrogen and phosphorus compounds. Filtration and adsorption is most efficient in unsaturated fine-textured soils and least efficient in saturated coarse soils. Nitrate-nitrogen moves freely through the soil, while ammonium nitrogen is readily adsorbed by soil particles. Phosphorus is generally combined with other compounds which easily precipitate and are trapped by soil adsorption. (SWF)

ACC# : L001151
AUTHOR: Kristiansen, R.
AFFIL : Agric. Res. Coun. of Norway, Section Soil Pollut. Res., 1432 Aas-NLH, Norway
TITLE : Sand Filter Trenches for Purification of Septic Tank Effluent: I. The Clogging Mechanism and Soil Physical Environment
SOURCE: Journal of Environmental Quality, 10(3):353-357 (5 pages)
YEAR : 1981
TEXT : This is the first of three articles on sand filter trenches for treating septic tank effluent. Three pilot plant sand filters, one heated and two at ambient temperatures, were observed to explain the relationship between clogging and soil physical and chemical environment in the sand filters. Discusses ponding rates, C/N ratio, bacteria and bacterial exudates, redox potential, and atmosphere within the sand filters. (AU/SWF)

ACC# : L001152
AFFIL : Agric. Res. Coun. of Norway, Section Soil Pollut. Res. 1432 Aas-NIH, Norway
AUTHOR: Kristiansen, R.
TITLE : Sand Filter Trenches for Purification of Septic Tank Effluent: II. The Fate of Nitrogen
SOURCE: Journal of Environmental Quality, 10(3):358-361 (4 pages)
YEAR : 1981
TEXT : This is the second of three articles about the use of sand filter trenches to treat septic tank effluent. Three sand filters are heated and two at ambient temperature were observed to determine the fate of nitrogen in the system. Insignificant amounts of N were found to be removed from effluent passed through the filters. Suggests equal distribution of effluent, intermittent loading, and use of a soil with a higher cation exchange capacity than sand to improve nitrogen removal in septic systems. (AU/SWF)

ACC# : L001153
AUTHOR: Brandes, M.
AFFIL : Ontario Ministry of the Environment, Toronto, Canada
TITLE : Effect of Precipitation and Evapotranspiration of a Septic Tank-Sand Filter Disposal Systems
SOURCE: Journal Water Pollution Control, 52(1):59-75 (17 pages)
YEAR : 1980
TEXT : A one-year field study was conducted in Ontario to investigate the operation of a septic tank/underdrained sand filter wastewater disposal system. The focus of the study centered on the effect of precipitation and evapotranspiration on the removal of chemical and bacterial contaminants by the sand filter medium. Septic tank effluent was pumped to a 18.3 by 15.2 m mound-shaped sand filter lined with a polyvinyl chloride sheet to prevent soil infiltration. A sod cover was placed on the sand filter surface to prevent erosion of the sand filter medium. The results showed that the highest evapotranspiration rate occurred during the warm growing season. The yearly average evapotranspiration rate indicated that 58 percent of the total precipitation was removed by evapotranspiration. The removal of total and fecal organisms from the effluent was approximately 100 percent. Phosphorus and nitrogen retention in the sand filter were 42.6 and 40.4 percent, respectively. (SWF)

ACC# : L001154
AUTHOR: Carlile, B.L, Cogger, C.G., Sobsey, M.D., Scandura, J., Steinbeck, S.J.
AFFIL : Department of Soil Science, North Carolina State University, Raleigh, North Carolina, et al.
TITLE : Movement and Fate of Septic Tank Effluent in Soils of the North Carolina

Coastal Plain
SOURCE: Coastal Plains Regional Commission, Division of Health Services, North Carolina Department of Human Resources (60 pages)
YEAR : 1981
TEXT : The movement and treatment of effluent from septic tank systems on North Carolina's lower coastal plain was studied. Part I reports results of examinations of groundwater quality, water table location, and soil properties. The most important factor affecting effluent movement and treatment was water table depth. Pressure distribution of effluent improved treatment in high-watertable soils if the system was not continuously saturated. Low chroma (grayish) colors in the soil were a good indicator of seasonal high water tables. Part II considers a septic system's ability to remove enteric viruses, concluding that where high-watertables and poorly absorptive soils are present, enteric viruses can contaminate groundwater. (AU/SWF)

ACC# : L001155
AUTHOR: Frome, M.
AFFIL : Vermont Natural Resources Council, Montpelier, Vermont
TITLE : Rural Sewage Treatment in Vermont-Book 1: A Guide to the Alternatives
SOURCE: Vermont Natural Resources Council, Montpelier, Vermont (130 pages)
YEAR :
TEXT : Written to help the general public understand their own sewage treatment problems, this book presents basic technical information on sewage treatment in layman's terms and explains the laws, regulations and agencies which govern sewage treatment in Vermont. Some of the choices for treating sewage in rural communities include: the conventional septic system, alternative onsite systems, waterless toilets, water conservation and flow devices, and centralized sewage systems. Appendices provide lists of federal, state, regional and state university contacts, manufacturers and consulting engineers. (AU/SWF)

ACC# : L001156
AUTHOR: Yount, G.L.
AFFIL : VSP Wastewater Technology, Gettysburg, PA
TITLE : Selected Topics: Marketing of I/A Technology and Services
SOURCE: Individual Onsite Wastewater Systems - Proceedings of the Eighth National Sanitation Foundation Conference, 1981, Ann Arbor, Michigan (12 pages)
YEAR : 1982
TEXT : One company's effort to market innovative/alternative wastewater technology in a rural community under the Construction Grants Program found engineers and regulatory officials to have rigid attitudes and a preoccupation with centralized sewerage facilities. The article concludes that despite regulations which encourage I/A technology, communities often associate availability of federal funds with plans employing only centralized facilities. This results in decisions that are seldom based on an appropriate or economically feasible alternative plan. (SWF)

ACC# : L001157
AUTHOR: Kristiansen, R.
AFFIL : Agric. Res. Coun. of Norway, Section Soil Pollut. Resd., 1432 Aas-NLH, Norway
TITLE : Sand-Filter Trenches for Purification of Septic Tank Effluent: III. The Microflora
SOURCE: Journal of Environmental Quality, 10(3):361-364 (4 pages)
YEAR : 1981
TEXT : This is the third of three articles about the use of sand filter trenches to treat septic tank effluent. Size distribution and proportions of important bacterial groups are discussed, along with the biomass at different depths below the filter surface. Efficient removal of bacteria was observed in clogged absorption fields as compared with unclogged fields, suggesting that intermittent loading may reduce purification efficiency unless very small application rates are used so that flow through the sand filter remains highly unsaturated. (SWF)

ACC# : L001158
AUTHOR: Harkin, J.M., Jawson, M.D.
AFFIL : Department of Soil Science, University of Wisconsin-Madison and USDA Agricultural Research Service, Washington State University, Pulmann, Washington
TITLE : Clogging of Soil by Septic Tank Effluent and Its Oxidative Reversal
SOURCE: Proceedings of Northwest On-Site Waste Water Disposal Short Course, December 8 & 9, 1976, University of Washington, p. 53-61 (9 pages)
YEAR : 1976
TEXT : Soil column experiments show that clogging is caused by water-repellent bacterial polysaccharide slimes produced by anaerobic bacteria. Hydrogen peroxide oxidizes and mechanically agitates the crusted surface

when gaseous oxygen is released. The treatment was successful in the soil columns and field studies. (SWF)

ACC# : L001159
AUTHOR: Otis, R.J.
AFFIL : Department of Civil and Environmental Engineering, University of Wisconsin, Madison, Wisconsin
TITLE : Pressure Distribution Design for Septic Tank Systems
SOURCE: Journal of the Environmental Engineering Division, Proceedings of the American Society of Civil Engineers, 106(EE1):123-140 (18 pages)
YEAR : 1982
TEXT : Design criteria for pressure distribution of septic tank effluent in subsurface soil absorption systems is described, and a simplified design procedure is presented. Topics include suggested methods of effluent distribution for various system designs and soil permeabilities, flow relations in distribution networks, in-line pressure, sloping sites, and dosing frequencies and chamber sizing. A ten-step design procedure is outlined and illustrated with an example. Includes flow equations, nomographs, diagrams. (SWF)

ACC# : L001160
AUTHOR: Lund, L.J., Page, A.L., Nelson, C.O., Elliott, R.A.
AFFIL : University of California, Riverside, CA
TITLE : Nitrogen Balances for an Effluent Irrigation Area
SOURCE: Journal of Environmental Quality, 10(3):349-352 (4 pages)
YEAR : 1981
TEXT : An 8.5-ha pasture irrigated with secondary sewage effluent was studied to determine the fate of nitrogen applied to the effluent. Soils of the Corralitos series (Typic Xeropsamment) at nine plots were sampled twice to evaluate the spacial and temporal variations in the field water contents of nitrate-nitrogen and chlorine concentrations in the unsaturated zone below the root zone. Field contents varied in space but not in time. Mean nitrate-nitrogen concentrations in the soil solution ranged from 15.4 to 32.4 mg per liter and varied significantly in space and time. Mean chlorine concentrations varied in a similar manner. Averages of nitrogen balances developed for three of the nine plots attributed 32, 60, and 9 percent of the nitrogen applied in the effluent to crop removal, leaching, and gaseous losses, respectively. (AU)

ACC# : L001161
AUTHOR: Ragab, R., Feyen, J., Hillel, D.
AFFIL : Laboratory of Soil Physics, Catholic University of Louvain, Belgium
TITLE : Comparative Study of Numerical and Laboratory Methods for Determining the Hydraulic Conductivity Function of a Sand
SOURCE: Soil Science, 131(6):375-388 (14 pages)
YEAR : 1981
TEXT : Experimentally measured hydraulic conductivity-water content relationships are compared with those predicted by three models. Laboratory methods used included instantaneous profile-internal drainage, infiltration through crust, hot air drying, pressure plate outflow and unit gradient drainage. For the numerical approach, the Irmay, the Jackson and the Mualem models are used. The instantaneous profile technique yields the highest conductivity values. The discrepancies between measured and predicted values are small. (AU/SWF)

ACC# : L001162
AUTHOR: Triangle J Council of Governments
AFFIL : Triangle J Council of Governments, P.O. Box 12276, Research Triangle Park, North Carolina 27709
TITLE : Regulation and Management of Septic Systems Region J, North Carolina
SOURCE: Triangle J Council of Governments, P.O. Box 12276, Research Triangle Park, North Carolina 27709, (141 pages)
YEAR : 1979
TEXT : Regulation and management of on-site wastewater systems is the key to preventing system failure. This report reviews legislative and regulatory aspects of system construction and maintenance in North Carolina. Responsible agencies, jurisdiction, statutory procedures, laws and regulations governing the State Health Service and State Environmental Management Commission, County arrangements, enforcements, and permitting are reviewed in detail. Maintenance and operating powers and alternatives are reviewed for the full range of local units such as cities, counties, sanitary districts, and private waste and sewage companies. A brief section compares North Carolina's approach with those of other states. Gaps in legal authority within the state are discussed, along with some general management options. Appendices

contain relevant statutory and administrative provisions. (SWF)

ACC# : L001163
AUTHOR: Bowman, B.O.
AFFIL : Division of Environmental Health, 4080 Chain Bridge Road, Fairfax Virginia 22030
TITLE : Reliability of On-Site Sewage Disposal Systems in Fairfax County, Virginia
SOURCE: Journal of Environmental Health, 44(5):249-252 (4 pages)
YEAR : 1982
TEXT : Longevity of onsite sewage disposal systems and the causes of failures were investigated in Fairfax County, Virginia, during the period 1952-1978. Causes of system malfunctions and mechanical failures were identified. It was concluded from the study that onsite sewage systems are a viable means of disposal of small wastewater flows when a comprehensive regulatory program is utilized to determine soil suitability and to monitor construction during installation. (AU)

ACC# : L001164
AUTHOR: Peasley, H.P., McKinney, L.A.
AFFIL : Howard Peasley and Associates, Richmond, Virginia
TITLE : Sewage Treatment Apparatus, U.S. Patent No. 3,984,322
SOURCE: Howard Peasley and Associates, Richmond, Virginia (6 pages)
YEAR : 1976
TEXT : Describes an aerobic bacteria sewage treatment device using compressed air to aerate activated sludge in this publication from the United States Patent Office. (SWF)

ACC# : L001165
AUTHOR: Peasley, H.P.
AFFIL : Howard Peasley and Associates, Richmond, Virginia
TITLE : Sewage Treatment Apparatus, U.S. Patent No. 4,036,754
SOURCE: Howard Peasley and Associates, Richmond, Virginia (9 pages)
YEAR : 1977
TEXT : Provides a description and drawings of an aerobic bacteria sewage treatment apparatus for treating wastewater mixed with activated sludge in this publication from the United States Patent Office. (SWF)

ACC# : L001166
AUTHOR: NA
AFFIL : Triangle J Council of Governments, Research Triangle Park, North Carolina
TITLE : Individual Wastewater Project: Final Report
SOURCE: Triangle J Council of Governments, P.O. Box 12276, Research Triangle Park, North Carolina 27709 (70 pages)
YEAR : 1980
TEXT : Discusses an individual wastewater project developed under "208" area planning for a part of North Carolina. More than half of the residents are served by septic tanks, and between 10 and 30 percent of these provide inadequate treatment and disposal during some periods of the year. Describes reasons for failing systems and alternative treatment and disposal methods, including self-containing toilets, conventional system modifications, water conservation, failing system rejuvenation, discharging systems, and septage disposal. A variety of alternative systems were evaluated including low-pressure pipe distribution, mound systems, two-compartment septic tanks, above- ground access risers, drainfield repair, and dual drainfields. Reviews local regulations governing management, and suggests some revisions. (SWF)

ACC# : L001167
AUTHOR: Triagle J Council of Governments
AFFIL : Triangle J Council of Governments, P.O. Box 12276, Research Triangle Park, North Carolina 27709
TITLE : Summary of On-Site Wastewater Treatment and Disposal Methods Region J, North Carolina
SOURCE: Triangle J Council of Governments, P.O. Box 12276, Research Triangle Park, North Carolina 27709, (99 pages)
YEAR : 1978
TEXT : Presents information about onsite alternative treatment and disposal systems being evaluated experimentally at Region J, North Carolina. Alternative systems, modification to conventional onsite systems, self-contained in-house toilet systems, cluster systems, effluent discharge systems, wastewater disinfection, and septage disposal are described and evaluated. Also included is a chapter on rejuvenation techniques for failing systems. Each alternative method is discussed.

Includes a list of basic components, installation procedures, estimated costs, advantages and disadvantages, geographic suitability, and references. (SWF)

ACC# : L001168
AUTHOR: NA
AFFIL : NA
TITLE : The Magic Box: Your Septic Tank
SOURCE: Florida Septic Tank Association (8 pages)
TEXT : A pamphlet aimed at the individual homeowner describes the basic features of septic tanks and seepage fields and warns about problems of overloading and improper grease disposal. Recommends bi-annual inspection and pumping-out as needed. Lists warning signals of system failure. Discusses Florida requirement for grease interceptors at restaurants also. (SWF)

ACC# : L001169
AUTHOR: Amato, P.W., Goehring, H.D.
AFFIL : University of Wisconsin-Extension, Small Scale Waste Management Project
TITLE : Land Use and Policy Implications in a Three County Wisconsin Area
SOURCE: University of Wisconsin-Extension, Small Scale Waste Management Project, (126 pages)
YEAR : 1974
TEXT : Discusses effects of small scale waste management on land use and public policy in Southeastern Wisconsin in this report. Discusses alternatives to conventional septic systems, with emphasis on mounded soil absorption fields. A case study of three counties in the Southeastern Wisconsin Regional Planning Area reviews existing and proposed land uses, population distribution and impact of individual household sewage on environmental equality. Reviews policy implications of this change in small- scale waste management in terms of legislation, citizen preferences for housing location, technological impact, county and regional planning, and state control of location of small-scale systems. (SWF)

ACC# : L001170
AUTHOR: Rockefeller-A
AFFIL : Humanities Teacher, New England Conservatory
TITLE : Toilets That Don't Need Flushing
SOURCE: Catalyst, 5(1):15-18 (4 pages)
YEAR : 1978
TEXT : Discusses economic and environmental advantages for segregating organic wastes and water, and gives an overview of the composting process and the benefits of the Clivus Multrum composting toilet. Included is a diagram illustrating how the Clivus Multrum works. (SWF)

ACC# : L001171
AUTHOR: H.W. Selby and R.O. Mankes
AFFIL : PureCycle Corporation, Boulder, Colorado 80306
TITLE : Wastewater Recycling is Now Available
SOURCE: Individual Onsite Wastewater Systems - Proceedings of the Sixth National Conference, Ann Arbor, MI, 1979 (9 pages)
YEAR : 1980
TEXT : Describes the Pure Cycle system which was designed and developed to recycle all domestic water at the home site. Provides data on cost, operation and maintenance. The treatment processes utilized by the system are anaerobic digestion, aerobic digestion, ultrafiltration, carbon adsorption, demineralization and ultraviolet disinfection. (SWF)

ACC# : L001172
AUTHOR: NA
AFFIL : NA
TITLE : New Compost Toilet on Trial in Albany
SOURCE: BioCycle, Journal of Waste Recycling, 23(2):57 (1 page)
YEAR : 1982
TEXT : A new style composting toilet that uses passive solar energy to enhance biological decomposition and evaporate liquids was tested during two summer months at a state park. The system is intended to serve remote sites which demand a low-maintenance, pollution free facility. Design and operating principles are outlined. (SWF)

ACC# : L001173
AUTHOR: Otis, R.J.
AFFIL : Department of Civil and Environmental Engineering, University of

Madison, Madison, Wisconsin
TITLE : Rehabilitation of Mound System
SOURCE: On-Site Sewage Treatment - Proceedings of the Third National Symposium on Individual and Small Community Sewage Treatment, 1981, American Society of Agricultural Engineers, St. Joseph, Michigan (5 pages)
YEAR : 1982
TEXT : A case study describes three attempts to rehabilitate a failed mound system for a small industry. Failure, all three times, was due to hydraulic overloading and entry of exotic waste products. Replacement of gravel bed and/or expansion of the mound were two successful methods used to increase the absorption capacity of the mound. Chemical oxidation was not found to be an effective technique under the circumstances encountered. A water conservation program was very effective in reducing the total waste flow. Wider gravel beds (greater than 10 feet) in mounds constructed of medium sand fill over shallow permeable soils appear to be possible but need further investigation. (SWF)

ACC# : L001174
AUTHOR: Ckeke, A.C., Converse, J.C., Tyler, E.J., Bubenzer, G.B.
AFFIL : Dept. of Agricultural Engineering, Geological and Natural History Survey, Dept. of Soil Science, Small Scale Waste Management Project, College of Agriculture and Life Sciences, University of Madison, Madison, Wisconsin
TITLE : Spacing of Curtain Drains on Sloping Land for On-Site Soil Absorption System
SOURCE: On-Site Sewage Treatment - Proceedings of the Third National Symposium on Individual and Small Community Sewage Treatment, 1981, American Society of Agricultural Engineers, St. Joseph, Michigan (10 pages)
YEAR : 1982
TEXT : A mathematical model characterizes the steady state water table in a moderately sloping aquifer with a seepage bed placed between nonrecharged areas within parallel curtain drains. The model is applied to two cases. Water table height increases as the recharge rate increases for a given recharge width and slope of land. Low recharge rates are necessary to be able to keep the water table within desired heights. Slope has very little effect on maximum height of water table for the same recharge rate, but slope affects the lateral location of maximum water table height. (AJ/SWF)

ACC# : L001175
AUTHOR: Staudt, J.G., Jr., Niehus, D.C.
AFFIL : U.S. EPA, Washington, DC
TITLE : EPA's Planning and Management Approach for Small Alternative Wastewater Systems - A Solution for Small Communities
SOURCE: On-Site Sewage Treatment - Proceedings of the Third National Symposium on Individual and Small Community Sewage Treatment, 1981, American Society of Agricultural Engineers, St. Joseph, Michigan (7 pages)
YEAR : 1982
TEXT : Describes EPA's Small Alternative Wastewater Systems (SAWS) Strategy. The major objective is the development of a comprehensive planning and management approach to promote the use and improve the performance and acceptance of SAWS. EPA activites include promotion of appropriate technology, facility planning improvement, construction grant program management, financial planning and management, and facility compliance. Within the limits of its decreasing resources, EPA will assist states in designing and implementing programs to encourage the use of SAWS technology and innovative management programs. A number of activities which states could undertake are outlined. (SWF)

ACC# : L001176
AUTHOR: Colt, J., Mitchell, S., Tchobanoglous, G., Knight, A.
AFFIL : University of California, Davis, California 95616
TITLE : The Use and Potential of Aquatic Species for Wastewater Treatment: The Environmental Requirements of Fish, Appendix B
SOURCE: The State Water Resources Control Board Publication No. 65, Sacramento, California (245 pages)
YEAR : 1979
TEXT : This annotated bibliography deals with the environmental requirements of selected fish species potentially useful in wastewater treatment. The culture of five native species of fish (catfish, trout, carp, tilapia, blackfish) is discussed with regard to the effects of specific physical, biological and chemical parameters, including that of metabolic wastes, on physiology, growth, and mortality. The effects of the given parameters are considered independently. Yield and chemical compoosition data are discussed for each of the species considered. Indexed by subject and author. (SWF)

ACC# : L001177
AUTHOR: Ellis, B., Childs, K.E.
AFFIL : Upper Great Lakes Regional Commission and the Michigan Depoartment of Natural Resources
TITLE: Nutrient Movement from Septic Tanks and Lawn Fertilization
SOURCE: Department of Natural Resources, Technical Bulletin No. 73-5, Water Resources Commission, Bureau of Water Management, Houghton Lake, Michigan (86 pages)
YEAR : 1973
TEXT : Nutrient movement in groundwater and soils around Michigan's Houghton Lake was studied during 1971-73. Factors evaluated were groundwater movement of phosphorus and nitrate-nitrogen from septic tank effluent, phosphorus adsorption by specified local soil types, and phosphorus movement through soils following lawn fertilization. In six of 19 sites, nutrients moved into the groundwater. Phosphorus entered the groundwater in one-half of fertilized lawns studied. The study recommended that septic systems be used only as temporary waste disposal methods in areas with high potential for development and surface water contamination. Siting criteria should emphasize soil and groundwater characteristics. Fertilization should be based on soil tests. Area groundwater and soil maps are included. (AU/SWF)

ACC# : L001178
AUTHOR: Adrian, D.D.
AFFIL : Environmental Engineering Program, Department of Civil Engineering, University of Massachusetts, Amherst, Massachusetts
TITLE : Suitability of New England Soils in Accepting Waste Effluents: Phase II
SOURCE: Water Resources Research Center, University of Massachusetts, Amherst, Massachusetts (142 pages)
YEAR : 1976
TEXT : This is the second of two reports discussing research on the suitability of New England soils in accepting wastewater effluent. Describes physical characteristics and local distribution of fragipan soils, heavy metal reactions in effluent applied to the soil, and nitrogen transformations in soil-applied wastewater. Presents a mathematical model describing nitrogen transformations during lagoon storage, and discusses proper land application rates for lagoon effluents, based on a computer simulation of annual precipitation. (AU/SWF)

ACC# : L001179
AUTHOR: White, G.B.
AFFIL : Department of Civil Engineering, West Virginia University
TITLE : Fundamental Elements and Cost Considerations of Pressure Sewer Systems
SOURCE: West Virginia University (102 pages)
YEAR : 1980
TEXT : Advantages, disadvantages, and factors that affect the cost of pressure and gravity collected sewage systems are examined in this West Virginia University master's thesis. Maintenance considerations and descriptions of pressure sewer system components are also discussed. Case histories, management models, funding sources, governing regulations and current costs are provided for both septic tank effluent pump (STE) and grinder pump (GP) systems. The report concludes that, under given circumstances, pressure sewer systems can be more cost-effective than either on-site or gravity collected systems. (AU)

ACC# : L001180
AUTHOR: DioGato-FD
AFFIL : Bureau of Water Quality Management, Pennsylvania Department of Environmental Resources, Harrisburg, Pennsylvania 17120
TITLE : Community Onsite Disposal Systems: The Iselin Demonstration Project
SOURCE: Individual Onsite Wastewater Systems - Proceedings of the Seventh National Conference 1980, p. 170-204 (26 pages)
YEAR : 1981
TEXT : Provides a case history of a state-sponsored program to study community on-site disposal technology, develop innovative methods and design and construct projects in rural Pennsylvania. Institutional, technical and economic factors are analyzed for one project which includes septic effluent treatment by disposal in coal refuse. Design aspects discussed include collection system (small-diameter effluent sewers), treatment tank, pressure distribution and absorption beds. (SWF)

ACC# : L001181
AUTHOR: NA
AFFIL : Asian Institute of Technology, P.O. Box 2745, Bangkok, Thailand
TITLE : Water Pollution Control in Developing Countries
SOURCE: Pergammon Press Inc., Maxwell House, Fairview Park, Elmsford, NY 10523
YEAR : 1978

TEXT : These proceedings from the international conference held at Bangkok, Thailand, February 21-25, 1978, contain over 100 papers and keynote addresses. Volume I covers numerous topics: water quality management, water quality modeling and monitoring, economics, municipal and industrial treatment, solids/sludge handling, and biological/physical/chemical treatment processes. Volume II contains additional papers and a list of participants. Selected articles are separately abstrated in the SWF Bibliography. (SWF)

ACC# : L001182
AUTHOR: NA
AFFIL : NA
TITLE : Getting to Know Your Septic Tank
SOURCE: Triangle J Council of Governments, P.O. Box 1176, Research Triangle Park, North Carolina (3 pages)
YEAR :
TEXT : Pamphlet presents a synopsis of how a septic system operates, how to determine if your system is failing, the consequences of a failing system, where local advice about septic systems can be obtained, and tips for simple septic tank maintenance. (SWF)

ACC# : L001183
AUTHOR: Ratasuk, S., Klinsukonth, C.
AFFIL : Environmental and Ecological Research, and Applied Scientific Research Corporation of Thailand, 196 Phabonyothin Road, Bangkhen, Bangkok
TITLE : Cesspool Sludge Undergoes Treatability Study
SOURCE: Water & Sewage Works, 72(3):48-57 (3 pages)
YEAR : 1980
TEXT : Lagoon treatment of sludge collected by Bangkok's cesspool system proved to be an economically and environmentally impractical method of sludge disposal. A laboratory study determined that chemical coagulation of the cesspool sludge should be the initial treatment step. The thickened sludge is stored for use as a soil amendment or dewatered on sand beds. The primary effluent can be treated further in oxidation ponds, open sand filters or used for land irrigation following chlorination. (SWF)

ACC# : L001184
AUTHOR: NA
AFFIL : Western Colorado Rural Communities Program and Colorado Cooperative Extension Service
TITLE : So Your Community Has a Sewage Problem! Have You Considered...
SOURCE: Colorado State University, Cooperative Extention Service, Fort Collins, Colorado
TEXT : Pamphlet from Colorado Cooperative Extension stresses alternatives to centralized sewage treatment plants. Offers a few alternatives which may be used individually or in combination. (SWF)

ACC# : L001185
AUTHOR: Reist, P.C., Zimmerman, M.J., Turner, A.G., Francisco, D.E., Robinson, P., Overcash, P.M., Sneed, R.
AFFIL : University of North Carolina, Department of Environmental Sciences and Engineering, North Carolina State University
TITLE : Wastewater Spray Transport in Land Application
SOURCE: Water Resources Research Institute of the University of North Carolina, Raleigh, North Carolina (220 pages)
YEAR : 1980
TEXT : Results of a study designed to predict aerosolized viable particle dispersion from a wastewater spray system, considering the effects of particle size, microorganism viability, and meteorological parameters. Two spray solutions, one containing E. coli. as a viable atmospheric tracer and one containing uranine, a non-decaying flourescent dye, were simultaneously sprayed in an open field and their downwind concentrations determined by sampling to a maximum distance of 311 meters to develop an atmospheric dispersion model, empirical results were investigated in terms of both a standard Gaussian plume distribution, as well as a non-Gaussian linear multiple regression analysis. The E. Coli. viability model indicated that the natural log of the bacteria was inversely related to relative humidity, and to a lesser extent, with airborne time, and directly related to solar radiation. Significance of a health hazard from predicted exposure cannot be concluded without further investigations into dose-response infectivity and disease studies of airborne pathogens. (AU/SWF)

ACC# : L001186
AUTHOR: NA
AFFIL : NA
TITLE : Sewage Facilities Plan: Fountain Run Kentucky

SOURCE: Parrott, Ely and Hurt, Consulting Engineers, Inc., Lexington, Kentucky 40502 (150 pages)
YEAR : 1978
TEXT : Describes an EPA-funded wastewater facilities design and construction plan developed for a 2,200 acre water district serving 500 persons, 19 small businesses and one factory in rural southern Kentucky. Failing septic systems, mostly on low permeability soils, along with several unsanitary pit privies, were the area's main water pollution problems. Environmental factors including natural communities, topography, geology, soils, climate and hydrology are discussed. Four prospective management plans are considered: (1) gravity sewer system with a central oxidation lagoon followed by an infiltration-percolation system; (2) solids removal and on-site storage with liquid effluent conveyed partly by pressure sewers to central treatment; (3) effluent sewers linked to community disposal sites for most units, with the remainder using on-site systems; and (4) on-site disposal for all units. Based on cost and feasibility, option 3 was selected. A complete cost analysis is provided. (SWF)

ACC# : L001187
AUTHOR: Cowan, P.A., Middlebrooks, E.J.
AFFIL : Utah Water Research Laboratory, College of Engineering, Utah State University, Logan, Utah 84322
TITLE : Modeling the Performance of the Intermittent Sand Filter
SOURCE: Utah Water Research Laboratory, College of Engineering, Utah State University, Logan, Utah 84322 (126 pages)
YEAR : 1979
TEXT : Several models were developed to predict the efficiency of the intermittent sand filter (ISF) in removing algae from wastewater stabilization pond effluent. Volatile suspended solids (VSS) was the analytical technique used to identify algal concentrations. Design curves, in which period of filter operation was described as a function of mass loading, were developed for ISF systems containing 0.17, 0.40, and 0.68 mm effective sand size media. Wastewater stabilization pond effluents having calcium carbonate precipitation problems were included as a special case in this analysis. (AU/SWF)

ACC# : L001188
AUTHOR: Harkin, J.M.
AFFIL : Department of Soil Science, University of Wisconsin
TITLE : Status Report on the Porox (Hydrogen Peroxide) Process
SOURCE: Individual Onsite Wastewater System - Proceedings of the Sixth National Sanitation Foundation Conference 1979, Ann Arbor, MI (8 pages)
YEAR : 1980
TEXT : The proprietary POROX process is described in this status report. The process was developed to rehabilitate septic tank systems that have failed because of soil clogging. Hydrogen peroxide dissolves organic and inorganic materials that clog soil pores under soil absorption trenches. The treatment restores the soil to its initial permeability. Case histories outlining application of the POROX process to repair septic tank systems are included. (SWF)

ACC# : L001189
AUTHOR: O'Brien, W.
AFFIL : Black & Veatch Consulting Engineers, Dallas, TX
TITLE : Use of Aquatic Macrophytes for Wastewater Treatment
SOURCE: Journal of the Environmental Engineering Division, 107(EE4):681-698 (18 pages)
YEAR : 1981
TEXT : Aquatic macrophytes can be used to purify municipal and industrial wastewaters when treatment facilities are designed to advantageously use the natural characteristics of these plants. This paper (1) briefly reviews the biological characteristics of water hyacinth, ("Eichhornia crassipes"), and duckweed ("Lemna", "Spirodela", and Wolffia"sp.) when these plants are grown in wastewater; (2) summarizes available information on the performance of existing pilot and field-scale facilities; (3) suggests design criteria suitable for wastewater treatment facilities using water hyacinths; and (4 identifies areas which require additional research. (AU)

ACC# : L001190
AUTHOR: Fancy, J.
AFFIL : John Fancy Inc., Waldoboro, Maine 04572
TITLE : Individual Aerobic Plant Operation and Maintenance
SOURCE: Individual Onsite Wastewater Systems - Proceedings of the Sixth National Conference, Ann Arbor, MI, 1979 (15 pages)
YEAR : 1980
TEXT : A firm which services more than 450 aerobic plants outlines its program for servicing long-term operation of small aerobic treatment plants.

Initial plant acceptance, paperwork, field work and cost of servicing are described. (SWF)

ACC# : L001191
AUTHOR: Small, M.M.
AFFIL : Land and Freshwater Environmental Sciences Group, Brookhaven National Laboratory, Upton, New York 11973
TITLE : Wetlands Wastewater Treatment Systems
SOURCE: International Symposium, State of Knowledge in Land Treatment of Wastewater, Hanover, New Hampshire, August 20-25, 1978, (8 pages)
YEAR : 1978
TEXT : Discusses the effectiveness of two artifical wetland (meadow/marsh/pond and marsh/pond) sewage reclamation works located at Brookhaven National Laboratory, Upton, New York. Description of design and performance of the wetlands is given. Comparison of the wetlands effluent quality, energy use and capital costs was made to a conventional advanced waste treatment plant. Results showed that for less capital expense and a lower energy consumption wastewater reclamation by the wetlands was close to AWT plant performance. Design constraints necessary for properly operating artificial wetlands along with other possible wetland applications are also briefly discussed. (SWF)

ACC# : L001192
AUTHOR: Van der Ryn, S., Kroschel, M., Javits, T.
AFFIL : The Farallones Institute, Occidental, California
TITLE : Composting Privy-Technical Bulletin No. 1
SOURCE: The Farallones Institute, Occidental, California
YEAR : 1975
TEXT : The Farallones Institute, Occidental, California, designed and operates a composting privy which decomposes human wastes and organic material into a safe soil conditioner. Human excrement is mixed with saw dust, hay, straw and grass clippings to insure a proper carbon-nitrogen ratio and moisture content for composting. The pile is turned periodically to provide adequate aeration. The finished product is safe for use around fruit trees, shrubs and ornamental plantings. A section provides solutions to common problems associated with composting privies. A question and answer dialogue also considers treatment and disposal of greywater. (SWF)

ACC# : L001193
AUTHOR: Locker, C., Vansicle, L., Schoonover, D.
AFFIL : Modern Waste Treatment Systems, Inc., Champaign, Illinois 61820
TITLE : Experiences with the Use of Aerobic Plants and Soil Absorption Systems
SOURCE: Individual Onsite Wastewater Systems - Proceedings of the Seventh National Conference, 1980 p. 115-127 (13 pages)
YEAR : 1981
TEXT : Discusses the use of a proprietary Multi-Flo aeration plant followed by a subsurface disposal field. Test results show there are less suspended solids and organic material in the effluent, significantly higher amounts of dissolved oxygen and an increased amount of evapotranspiration. As a result of this increased treatment , previously failing soil absorption systems were shown to operate satisfactorily. Results suggest that higher wastewater loading rates were possible with the addition of an aerobic treatment. In areas where surface discharge is allowed, the Multi-flo system has been shown to meet state effluent standards. (SWF)

ACC# : L001194
AUTHOR: Lakshanamurthy, V., Fredlund, D.G.
AFFIL : Department of Civil Engineering, University of Saskatchewan, Canada
TITLE : A Mathematical Model for Predicting Moisture Flow in an Unsaturated Soil Under Hydraulic and Temperature Gradients
SOURCE: Water Resources Research, 17(3):714-722 (9 pages)
YEAR : 1981

TEXT : A theoretical model is presented to predict the moisture flow in an unsaturated soil as the result of hydraulic and temperature gradients. A partial differential heat flow equation (far above freezing conditions) and the two partial differential transient flow equations (one for the water phase and the other for the air phase) are derived and solved using a finite difference technique. The simultaneous solution of the partial differential equations gives the temperature, the pore water pressure, and the pore air pressure distribution with space and time in an unsaturated soil. The pressure changes can, in turn, be used to compute the quantity of moisture flow. (AU)

ACC# : L001195
AUTHOR: Bouma, J., Dekker, L.W.

AFFIL : Dept. of Applied Soil Physics, Netherlands Soil Survey Institute
TITLE : A Method for Measuring the Vertical and Horizontal K-Saturation of Clay Soils with Macropores
SOURCE: Soil Sci. Soc. Am. J., 45:662-663 (2 pages)
YEAR : 1981
TEXT : A field method is presented for measuring the vertical and horizontal K-saturation of a cube of soil which is carved out in-situ and covered with gypsum. The method is inexpensive and simple, evaluates the large soil sample required in clay soils, does not involve compaction of soil, can be used above the water table and defined K-saturation in terms of direction. Measurements indicate large differences between vertical and horizontal K-saturation values as measured within the same example. (AU/SWF)

ACC# : L001196
AUTHOR: Rutledge, E.M., Mote, C.R., Stafford, P.S., Mitchell, D.T., Scott, H.D., Harper, M.D.
AFFIL : Civil Engineering, Dept. of Agronomy, Agricultural Engineering, University of Arkansas at Fayetteville, and Espey, Houston and Associates, Inc. of Dallas
TITLE : Designing Septic Tank Filter Fields in Soils with Hydraulically Limiting Subsurface Horizons
SOURCE: On-Site Sewage Treatment-Proceedings of the Third National Symposium on Individual and Small Community Sewage Treatment 1981, American Society of Agricultural Engineers, St. Joseph, Michigan (8 pages)
YEAR : 1982
TEXT : Septic tank seepage field installed in soils containing low hydraulic conductivity horizons (generally less than 0.9 cm/day) impose special design considerations. This study proposes that a seepage bed be constructed in the upper horizon which has greater hydraulic conductivity than the hydraulically limiting horizon. Design criteria to prevent system failure in both wet and dry seasons are advanced. Factors considered include spacing between seepage beds, width and depth of seepage beds, side wall infiltration and crusting.

ACC# : L001197
AUTHOR: Hansel, J.
AFFIL : Minnesota Pollution Control Agency, 1935 West County Road, Roseville, Minnesota
TITLE : Onsite Sewage Treatment on Problem Soils
SOURCE: Water Pollution Control Federation 51st Annual Conference, October 5, 1978 (32 pages)
YEAR : 1978
TEXT : The Minnesota Pollution Control Agency began developing design criteria for both "standard" onsite systems and for alternative systems on a variety of problem soil conditions. This paper presents design criteria and practical experiences in the use of systems for the following problem soil conditions: high groundwater and bedrock, and slowly and rapidly permeable soils. Illustrations of the alternative methods are provided. (AU/SWF)

ACC# : L001198
AUTHOR: Batz, M.R.
AFFIL : Stinson Beach County Water District, Stinson Beach, California 94970
TITLE : Operation and Maintenance Function of an Onsite Wastewater Management District
SOURCE: Individual Onsite Wastewater Systems - Proceedings of the Sixth National Conference, Ann Arbor, MI, 1980 (11 pages)
YEAR : 1980
TEXT : Describes the development and implementation of an on-site wastewater management district in Stinson Beach, California. The program involves: 1) development of office procedures, 2) issuance of permits and citations, 3) inspection and monitoring program, 4) water quality monitoring program, and 5) submission of monthly reports. Also included are allocations of responsibility for maintenance, repair or replacement, and enforcement. (SWF)

ACC# : L001199
AUTHOR: NA
AFFIL : King County, Seattle, Washington
TITLE : Sewage Disposal Alternative
SOURCE: King County, Washington (Staff Report - May 1977), (82 pages)
YEAR : 1977
TEXT : This report analyzes and evaluates sewage management in King County, Washington, in light of recent decisions regarding sewer development and possible long-term use of alternative systems. More than two percent of single family dwellings are currently served by sewers linked to central treatment works. Existing sewers and on-site systems are described. Failing systems and system management, including new construction, O&M,

and rehabilitation are reviewed. The relationship between sewage disposal and land use planning is considered. A variety of sewage disposal alternatives is discussed, and four alternative management strategies are described. Recommendations for future development conclude the report. (SWF)

ACC# : L001200
AUTHOR: Funderburg, S.W., Moore, B.A., Sagik, B.P., Sorber, C.A.
AFFIL : University of Texas at San Antonio, Drexel University, and University of Texas at Austin
TITLE : Viral Transport Through Soil Columns Under Conditions of Saturated Flow
SOURCE: Water Research, 15(6):703-711 (9 pages)
YEAR : 1981
TEXT : Focuses on the application of soil columns to study the movement and behavior of three viruses in several soils possessing a variety of chemical and physical characteristics. Soils were sampled to a depth of 100 cm and packed into acrylic cylinders according to the vertical distribution and bulk density of the soil as found in the field. Sequential flooding of the columns with wastewater and distilled water resulted in a cyclical pattern of viral release in column percolates. The total number of viruses detected in percolates differed among the soils tested due to the differences among soil properties. Poliovirus recovery correlated most favorably with low soil cation exchange capacity (CEC) and high organic carbon and clay content. The recovery of coliphage was related to low soil organic carbon and residence time of liquid within a column in combination with either high soil pH or percent clay. As with poliovirus, detection of reovirus in soil column percolates was negatively correlated with soil CEC. (AU/SWF)

ACC# : L001201
AUTHOR: Hargett, D.L., Tyler, E.F., Siegrist, R.L.
AFFIL : Dept. of Soil Science, Geological and Natural History Survey, Dept. of Civil and Environmental Engineering, University of Wisconsin
TITLE : Soil Infiltration Capacity as Affected by Septic Tank Effluent Application Strategies
SOURCE: On-Site Sewage Treatment - Proceedings of the Third National Symposium on Individual and Small Community Sewage Treatment, 1981, American Society of Agricultural Engineers, St. Joseph, Michigan (13 pages)
YEAR : 1982
TEXT : The effects of method and rate of application of septic tank effluent to replicated soil absorption systems in an undisturbed silty clay loam subsoil were studied. Methods of application included conventional (simulated) and dosed (uniformly, once daily). Application rates were 2, 4 and 8 cm/day. The experiment was of limited duration (21 months) under specific soil conditions. The following conclusions were stated: Loss of infiltrative capacity is related to amount and frequency of application over time. Initial loss in permeability is very rapid regardless of application rate or method. Loading rates higher than those appropriate for soil conditions cause the most rapid and continuous declines in infiltration capacity. Conventional application is likely to produce system ponding. At reasonable application rates dosing can be useful in maintaining higher infiltrative capacity than conventional loading. For high loading rates, dosing has little long-term advantage over conventional application. (AU/SWF)

ACC# : L001202
AUTHOR: Gordon, M.S., Chapman, D.J.
AFFIL : Department of Biology, University of California, Los Angeles, CA 90024
TITLE : Aquaculture Approaches to Wastewater Nutrient Recycling
SOURCE: Office of Water Research and Technology, U.S. Department of Interior, Washington, DC (45 pages)
YEAR : 1979
TEXT : Laboratory scale studies were conducted at the University of California at Los Angeles to investigate a biological approach to wastewater recycling. Secondarily treated wastewater effluent was used to maintain an artificial food chain composed of successive monocultures of unicellular green algae (Scenedesmus sp.), herbivorous cladoceran crustaceans (Daphnia sp.) and carnivorous and herbivorous fish (Cyprinidae family). The results indicate that this aquaculture system is a viable method of providing reducing the nitrogen and phosphorus concentrations in the secondary effluent. Algal, cladoceran and fish cultures could be successfully maintained providing certain growth parameters were satisfied. A discussion of these growth parameters, as well as technical results pertaining to the biological productivity, dissolved nutrient uptake and release and heavy metal accumulation in the artificial food chain are included in this final report. (SWF)

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ACC#   : L001203
AUTHOR: Olsonbaker, J.
AFFIL  : NA
TITLE  : Sprinkle Irrigation Answers City's Waste Problem
SOURCE: Compost Science/Land Utilization, 21(3):35-37 (3 pages)
YEAR   : 1980
TEXT   : Sprinkle irrigation of alfalfa fields with secondarily treated effluent
         proved to be an economically successful method of effluent disposal for
         the city of Cranbrook, British Columbia, Canada.  A self-propelled
         center pivot irrigation system applies wastewater at a rate of 2,000
         gallons per minute to 1,000 acres of alfalfa.  A high-protein alfalfa
         crop was produced, containing 22 percent protein compared to 17.1
         percent protein in the noneffluent irrigated alfalfa.  Crop revenue,
         coupled with low operation and maintenance costs, made sprinkle
         irrigation an attractive effluent disposal method over other wastewater
         disposal techniques.  (SWF)

ACC#   : L001204
AUTHOR: Riekerk, H.
AFFIL  : School of Forest Resources, University of Florida
TITLE  : How Much Sewage Nitrogen on Forest Soils?  A Case History
SOURCE: BioCycle, Journal of Waste Recycling, 23(1):53-56 (4 pages)
YEAR   : 1982
TEXT   : Sewage sludge applications to forest soils supplies necessary plant
         growth nutrients and results in enhanced tree growth.  Excess sludge,
         though, will supply nitrogen in amounts detrimental to the environment.
         An application rate of 0.4 cm dry sludge/hectare/year sprayed on forest
         soils was determined through a field study to be an environmentally safe
         rate of sludge application.  A ground slope of less than 25 percent and
         porous, deep soils also aided in preventing surface runoff
         contamination.  Sludge application was achieved using a 30 m irrigation
         cannon and sludge pump attached to a tanker truck.  (SWF)

ACC#   : L001205
AUTHOR: Ingham, A.T.
AFFIL  : State of California, State Water Resources Control Board
TITLE  : Guidelines for Evapotranspiration Systems
SOURCE: State Water Resources Control Board, P.O. Box 100, Sacramento,
         California, (22 pages)
YEAR   : 1980
TEXT   : This report by the California State Water Resources Control Board
         presents guidelines with regard to the planning, design, construction
         and operation of evapotranspiration (ET) or evapotranspiration/
         infiltration (ETI) systems utilized for effluent disposal.  The use of
         ET/ETI systems should be considered when the disposal site is unsuitable
         for conventional soil absorption or alternative disposal methods
         (mounds, sand beds, etc.) are site- and economically impractical.  A
         design example is given, showing computations for an ET system.  It
         is a reference for regional water quality control boards, local
         health agencies and technical persons associated with ET/ETI systems.
         (SWF)

ACC#   : L001206
AUTHOR: Siegrist, R.
AFFIL  : Civil & Environmental Engineering, Small Scale Waste Management Project,
         University of Wisconsin, Madison, Wisconsin  43706
TITLE  : Segregation and Separate Treatment of Black and Grey Household
         Wastewater to Facilitate Onsite Surface Disposal
SOURCE: Small Scale Waste Management Project, 1 Agriculture Hall, University of
         Wisconsin, Madison, Wisconsin  53706  (33 pages)
YEAR   : 1977
TEXT   : Discusses the theory and application of waste segregation and separate
         treatment as a means of facilitating an onsite wastewater disposal
         system independent of soil conditions.  Description and quality of
         combined wastewater and segregated wastewater are given.  System
         application includes alternative toilet systems for blackwater and
         septic tank-sand filter system with surface disposal for greywater.
         System costs and schematic diagrams are provided.  (SWF)

ACC#   : L001207
AUTHOR: Peters, G.O.
AFFIL  : WAPORA, Inc., Chevy Chase, Maryland
TITLE  : Septic Leachate Detector Research
YEAR   : 1982
SOURCE: Environmental Impact Section, U.S. Environmental Protection Agency,
         Region V  (80 pages)
TEXT   : Two field trips and laboratory studies are discussed concerning the
         Septic Leachate Detector (SLD).  The SLD detects two parameters:
         fluorescence and conductivity.  A description of the instrument and
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theory of operation are given. Laboratory studies suggest three causes of localized increase in fluorescence to which the SLD might respond: 1) brighteners from cleaning products, 2) organic materials, and 3) by means of the micelle effect when sufficient concentrations of detergent are present. Thin layer chromatography can distinguish between brighteners and organic materials. Another laboratory experiment concerns the characteristics of septic tank effluents and correlations of fluorescence with other chemical parameters of interest. Soil column studies compared the mobility of major nutrients through soils relative to detergent whiteners. Field investigations concerned plume stability, plume emergence points, and stream plumes. The feasibility of detecting effluents with flouremetry alone is discussed. (SWF)

ACC# : L001208
AUTHOR: Christensen, L.A.
AFFIL : Natural Resource Economics Division, Economic Research Service, U.S. Department of Agriculture, Washington, DC 20250
TITLE : Irrigating with Municipal Effluent: A Socio Economic Study of Community
SOURCE: National Technical Information Service, 5285 Port Royal Road, Springfield, Virginia (52 pages)
YEAR
TEXT : This study examines experiences of eight communities using land to treat municipal effluents. Most systems evolved without long-range planning. No distinct methods for land acquisition and management related to the size of the community were identified. Factors identified as important for successful systems operation included a long planning horizon and good working relationships between community officials and landowners. Legal contracts were of secondary importance. Farmers did not adjust their fertilization rates, although they recognized the value of nutrients in the effluent. (SWF)

ACC# : L001209
AUTHOR: Sopper, W.E., Kerr, S.N.
AFFIL : Institute for Research on Land and Water Resources, The Pennsylvania State University, University Park, Pennsylvania
TITLE : Revegetation of Mined Land Using Wastewater Sludge
SOURCE: Public Works, 111(9):114-116 (3 pages)
YEAR : 1980
TEXT : The effect of sludge application on strip mined land was evaluated through use of demonstration plots in Pennsylvania coal fields. Liquid and dewatered sludges were incorporated into three test plots and the plots were then seeded with a mixture of two grasses and two legumes. All demonstration plots were highly successful in establishing a complete vegetation cover. Results from the monitoring program indicate that there were no harmful effects on the vegetation, soil or groundwater quality due to the sludge application. (SWF)

ACC# : L001210
AUTHOR: Ctis, R.J., Fey, R.T.
AFFIL : University of Wisconsin, Madison
TITLE : A Low-Cost Public Wastewater Facility for a Small Rural Community
SOURCE: Water Pollution Control Federation (28 pages)
YEAR : 1981
TEXT : Westboro, Wisconsin, is typical of hundreds of small rural communities in the Midwest which are in need of improved wastewater facilities but are unable to afford conventional sewerage. Though the residents were unable to afford conventional sewerage, the costs of constructing small-diameter sewers and a common subsurface soil absorption field were within their financial capabilities. This paper describes the planning, implementation and performance of the selected alternative wastewater facility. Savings in construction costs amounted to at least 12 percent, and operating costs were reduced by 65 percent over conventional gravity sewers and a stabilization pond facility. Operational experience indicates that changes in design would substantially increase the savings in future facilities. However, the authors cite drawbacks in the biases of engineers and regulatory officials, lack of knowledge and experience with design and performance of alternative technologies, and restrictive regulatory codes that are based on design criteria, materials and construction techniques which were developed for urban areas where conventional sewerage is used. (AU/SWF)

ACC# : L001211
AUTHOR: NA
AFFIL : Water Resources Center, Desert Research Institution, University of Nevada System, Reno, NV
TITLE : Water Conservation Devices - Residential Water Conservation
SOURCE: Water Research Capsule Report, Water Resources Scientific Information Center (WRSIC), Office of Water Research and Technology, U.S. Department

of Interior, Washington, DC 20204 (10 pages)
TEXT : The significance of water conservation and water conserving devices are described. Devices are plastic bottles, toilet inserts, improved ballocks, dual flush cycle modifications, water saving toilets, faucet aerators, spray tapes, flow control devices, pressure reducing valves, water conserving appliances, landscape irrigation equipment and water conservation innovations. The economic benefits realized by a number of communities which use these devices are given. (AU/SWF)

ACC# : L001212
AUTHOR: Swanson, G.R., Williamson, K.J.
AFFIL : Department of Civil Engineering, Oregon State University, Corvallis, OR
TITLE : Upgrading Lagoon Effluents with Rock Filters
SOURCE: Journal of the Environmental Engineering Division, EE6: 1111-1129 (10 pages)
YEAR : 1980
TEXT : The performance of a full-scale rock filter, designed and constructed as part of a stabilization lagoon expansion and upgrading project in the city of Veneta, California, was evaluated. The rock filter was intended to improve lagoon effluent by removal of suspended algal growth. Performance parameters included suspended solids, dissolved oxygen, BOD-5, COD, chlorophyll, phosphorus, ammonia, nitrate and organic nitrogen. Algal settling rates were calculated relative to hydraulic rate, algal species, effluent temperatures and other environmental conditions. It was concluded that the rock filter acts to clarify lagoon effluent through the mechanism of algal settling and adherence to the rock surface. The rock filter met daily maximum effluent limits of 20 mg/L for total suspended solids and BOD when the hydraulic loading rate was less than 0.30 cubic meters/cubmeter-day. Long-term operation expectations predict no substantial problems with plugging of the rock filters with organic matter, build-up of organic matter on the rocks, odor production or necessity of cleaning the rock bed. (SWF)

ACC# : L001213
AUTHOR: NA
AFFIL : Triangle J Council of Governments, P.O. Box 12276, Research Triangle Park, North Carolina 27709
TITLE : Design and Installatioun - Low Pressure Pipe Systems
SOURCE: Individual Wastewater Project, 208 Areawide Water Quality Management Plan, Triangle J Council of Governments, P.O. Box 12276, Research Triangle Park, North Carolina 27709, (51 pages)
YEAR : 1979
TEXT : The Low Pressure Pipe (LPP) system is an alternative effluent disposal method with application to sites not suitable for on-site wastewater disposal by conventional septic systems. The system involves a network of small-diameter (1 1/4-inch) perforated PVC pipes placed 6 to 18 inches deep in a soil absorption system. Septic tank effluent is pumped under low pressure (0.5 to 1.7 psi via a pumping chamber) throughout the perforated pipe network into the entire soil absorption system. Intermittent pumping allows the soil system to absorb the effluent prior to the next wastewater application. This project report on LPP systems includes sections on site and soil requirements, design and equipment specifications, installational and inspection procedures, and maintenance requirements. (SWF)

ACC# : L001214
AUTHOR: Kennedy, J.C.
AFFIL : Washington State Department of Social and Health Services, Olympia, Washington
TITLE : Anaerobic Filters for the Treatment of Residential Sewage
SOURCE: On-Site Sewage Treatment - Proceedings of the Third National Symposium on Individual and Small Community Sewage Treatment, 1981, American Society of Agricultural Engineers, St. Joseph, Michigan (7 pages)
YEAR : 1982
TEXT : The septic tank/anaerobic filter system is discussed as a practical and cost-effective method for residential sewage treatment. A process description includes flow diagrams, treatment efficiency and sludge characterization. Application and advantages for small community and household use are cited, including consistent 80 percent BOD removal and effective denitrification if accompanied by aerobic pretreatment or wastewater segregation and use of the RUCK system. The RUCK system, developed at the University of Connecticut, removes nitrogen from domestic wastewater through segregation of greywater and blackwater. (SWF)

ACC# : L001215
AUTHOR: Anderson, J.L., Machmeier, R.E., Hansel, M.J.
AFFIL : Dept. of Soil Science, Dept. of Agricultural Engineering, University of Minnesota and Minnesota Pollution Control Agency, Roseville, Minnesota

TITLE : Long-Term Acceptance Rates of Soils for Wastewater
SOURCE: On-Site Sewage Treatment-Proceedings of the Third National Symposium on Individual and Small Community Sewage Treatment, 1981, American Society of Agricultural Engineers, St. Joseph, Michigan (8 pages)
YEAR : 1982
TEXT : A review of literature concerning soil absorption system failures was conducted to determine whether such failure is inevitable for any system or whether soils possess a long-term acceptance rate which would permit a system to function indefinitely at its design capacity. The bulk of evidence supported the long-term acceptance rate concept. Proper site evaluation, construction, and maintenance are key factors in maintaining a system's capacity to absorb and treat sewage. Hydraulic properties obtained from soil survey reports can be used to estimate the long-term acceptance rates of most soils. (AU/SWF)

ACC# : L001216
AUTHOR: Ferrara, R.A., Harleman, D.R.F.
AFFIL : Dept. of Civil Engineering, Princeton University, Princeton, NJ; and Lab. for Water Resources and Hydrodynamics, Massachusetts Inst. of Tech., Cambridge, MA
TITLE : Dynamic Nutrient Cycle Model for Waste Stabilization Ponds
SOURCE: Journal of Environmental Engineering Division, 106(EE1):37-53 (10 pages)
YEAR : 1980
TEXT : The objective of this research was to develop a mathematical model for the dynamic analysis of facultative stabilization ponds and the prediction of time-variable effluent quality in terms of oxygen demand, pathogen contaminants and nutrient removal. The dynamic model developed in this study considers transient loading and meteorological inputs. Model components include carbon, nitrogen, and phosphorus in organic and inorganic forms as well as fecal coliform. The model has been calibrated and unified through application to two treatment sites. Assuming a fully mixed pond, conservation of mass equations are presented concerning each model component. (SWF)

ACC# : L001217
AUTHOR: Deese, P.L.
AFFIL : Urban Systems Research & Engineering, Inc., Cambridge, Massachusetts 02138
TITLE : Potential for Improving Residential Resource Efficiency Through Innovative Waste Management
SOURCE: Individual On-site Wastewater Systems - Proceedings of the Seventh National Conference 1980, Ann Arbor, MI (17 pages)
YEAR : 1981
TEXT : Integration among on-site waste management, water supply and on-site energy systems is presented in this study of typical rural or suburban single-family residences for the year 2000. Maximum use of land and interior space are combined with efficient waste management and minimum use of water and energy supplies. The ramifications of combining technologies are considered in selecting alternative waste systems for a hypothetical two-story, partial solar Boston dwelling. Alternatives discussed are: heat recovery from solid waste and greywater, methane gas recovery, nutrient reuse in gardening, anaerobic digestion, productive greenhouse with greywater leaching beds, solar distillation for drinking water, solar drying and pasteurization of blackwater sludge, wastepaper as fuel, and greywater pasteurization by solar heat to control odor. All alternatives are discussed on a general basis. (SWF)

ACC# : L001218
AUTHOR: Farnham, R.S., Brown, J.L.
AFFIL : Soil Science Department, St. Paul, MN
TITLE : Advanced Wastewater Treatment Using Organic and Inorganic Materials - Part I and Part II
SOURCE: Peat Congress - Proceedings from the Fourth International Congress 1972, Volume IV, Otaniem, Finland (15 pages)
YEAR : 1972
TEXT : A two-part research study describing a) the use of peat and soil in a biological treatment system designed to remove pollutants from wastewater and b) phosphorus removal in wastewater using calcium carbonate with mixed media materials. Both are rather unique multimedia trickle filter systems utilizing a variety of filter materials. Results from Part I show that peat and peat-soil mixes significantly reduced the phosphorus and organic levels of wastewater and that application rates may be relatively high on the filtering system using irrigation techniques. Results from Part II show that phosphate solubility is apparently controlled initially by adsorption followed by precipitation of a sparingly soluble salt, identified as a calcium phosphate corresponding to impure hydroxyapatite. (SWF)

ACC# : L001219
AUTHOR: Polprasert, C., Wangsuphachart, S., Muttamara, S.
AFFIL : Environmental Engineering Division, Asian Institute of Technology, Bangkok
TITLE : Composting Nightsoil and Water Hyacinth in the Tropics
SOURCE: Compost Science/Land Utilization, 21(2):25-27 (3 pages)
YEAR : 1980
TEXT : A full scale, ten-week study was conducted in Thailand to determine the feasibility of utilizing nightsoil and water hyacinths as raw materials in composting. A method called "ground-surface aerobic composting" was shown to be simple to construct and maintain, effective in destroying pathogenic organisms, and capable of retaining important nutrients in the compost pile. This method is highly feasible for most developing countries, providing a badly needed low-cost fertilizer for agricultural purposes. (SWF)

ACC# : L001220
AUTHOR: Bradley, R.M.
AFFIL : Project Manager, Engineering-Science, Consulting Engineers, Arcadia, California
TITLE : Disposal of Septic-Tank Contents in Cyprus
SOURCE: Water Pollution Control, 10(1):131-138 (8 pages)
YEAR : 1981
TEXT : Land disposal of septage in Cyprus was shown to be an acceptable interim solution pending construction of treatment facilities. Septic tank contents are stored in holding tanks on absorption pits prior to disposal in a eucalyptus forest. Septage application in the eucalyptus forest increases the heavy metal content of the soil. Lime treatment was effective in controlling odors and reducing the fecal coliform level of the septage. (SWF)

ACC# : L001221
AUTHOR: Hill, D.E., Frink, C.R.
AFFIL : The Connecticut Agricultural Experiment Station, New Haven, CT
TITLE : Septic System Longevity Increased by Improved Design
SOURCE: Journal Water Pollution Control Federation, 52(8):2199-2203 (5 pages)
YEAR : 1980
TEXT : The response of septic systems to changes in state and local regulations designed to improve their life span is investigated. Analyses of 3,156 systems show a nine year increase in longevity in the population of all systems from 1973 to 1978 and a decrease in the average rate of premature failures form 6.0 to 2.0 percent in each year class of installation. Improvement was due to design changes in 1961 and the required spring percolation tests in 1972. (AU/SWF)

ACC# : L001222
AUTHOR: Guttenplan, S.D.
AFFIL : CH2M Hill Southeast, Inc., Reston, VA
TITLE : Cluster Septic Tank-Soil Absorption Systems: A Cost-Effective Solution for a Rural New England Community
SOURCE: 54th Annual Conference of the WPCF, Detroit, Michigan, October 4-9, 1981 (20 pages)
YEAR : 1981
TEXT : Outlines a systematic approach used to evaluate problem areas and land-based treatment options for Bridgton, Maine. The use of soil scientists familiar with area soils and onsite system regulations simplifies the alternative evaluation procedure. The use of leaching chambers was recommended for several reasons: they require half the leachate application area of a conventional trench system, and they provide easy bed access, even leachate loading distribution and increased rates of aerobic decomposition of solids. Two septic tanks in series, a flow distribution structure and diversion boxes provide optimum use of the chambers and provide for periodic resting of each of the clusters. A 50 percent oversized application field should be standard practice, especially for cluster systems where continuous maintenance and process control mandate cluster rest periods. The total present worth and annual operation and maintenance cost of the proposed cluster system was one-half that of a biological-chemical treatment process with a land application system. (AU/SWF)

ACC# : L001223
AUTHOR: Birden, H.H., Cech, I.
AFFIL: The University of Texas Health Science Center, School of Public Health at Houston, P.O. Box 20186, Houston, TX 77025
TITLE : Lagged Correlation in Study of Spatial Pattern of Well Contamination
SOURCE: Water Research, 15:291-299 (9 pages)
YEAR : 1981
TEXT : Summarizes and analyzes the results of an investigation conducted since

1977 in a section of South Windsor, Connecticut. A sanitary study of drinking water wells in this area revealed that out of 66 indivdual wells, 19 had counts of fecal and total coliforms in excess of what is recommended for potable water quality by guidelines set by the Public Health Code of the State of Connecticut. The data of this survey were subjected to lagged cross-correlation and spectral analysis in order to quantify spatial interactions between individual wells and, thus, to identify the pattern and the origin of contamination. Results indicated that there was a channeled flow of bacterial pollution through the study area with very little lateral diffusion. The study demonstrated that in some situations biological contaminants can travel large distances underground without substantial attenuation by the aquifer material. (AU)

ACC# : L001224
AUTHOR: Bausum, H.T., Schaub, S.A., Kenyon, K.F., Small, M.J.
AFFIL : U.S. Army Medical Bioengineering Research and Development Laboratory, Fort Detrick, Frederick, Maryland
TITLE : Comparison of Coliphage and Bacterial Aerosols at a Wastewater Spray Irrigation Site
SOURCE: Applied and Environmental Microbiology, 43:(1):28-38 (11 pages)
YEAR : 1982
TEXT : Microbiological aerosols were measured on a spray irrigation site at Fort Huachuca, Arizona. The test site, a golf course driving range, was irrigated with secondary domestic wastewater effluent. Wastewater leaving the holding pond was seeded with coliphage f2 and used to model aerosol migrations. Air sampling was conducted at downwind distances up to 563 m. Indigenous bacteria and tracer coliphage were sampled from sprays of chlorinated and unchlorinated effluent during day and night periods. Up to 62 percent of the particles were in a size range allowing ready deposition in the human lung. Wastewater bacteria were reduced by chlorination normally practiced at the site. Coliphage f2 were far more resistant to chlorination and were readily detectable in aerosols from chlorinated wastewater. Downwind microbial levels were somewhat enhanced by nighttime conditions. (AU/SWF)

ACC# : L001225
AUTHOR: Khalid, R.A., Patrick, W.H.
AFFIL : Laboratory for Wetland Soils and Sediments, Center for Wetland Resources, Louisiana State University, Baton Rouge, Louisiana
TITLE : Kinetics of Nitrogen Loss in Simulated Wastewater Treatmen a Soil-Plant
SOURCE: Soil Science 132(5):325-329 (5 pages)
YEAR : 1981
TEXT : Researchers investigated the effect of nitrogen forms on the kinetics of N loss in a small-scale soil-plant system simulating overland flow conditions with controlled aerobic-anaerobic cycles. Substantial gaseous losses of applied labled ammonium sulfate indicate the presence of favorable oxidation-reduction conditions for the simultaneous occurrence of nitrification-denitrification reactions. Gaseous loss through ammonia volatilization was unlikely in this study, due to slightly acidic to neutral soil conditions. The labeled potassium nitrate accumulation in both the ammonium and nitrate treatments was negligible, indicating that potassium nitrate was not stable under the experimental conditions. This suggests that the denitrification process was not a limiting factor in the gaseous loss of applied N. The conversion of potassium nitrate to ammonium sulfate as a consequence of respiratory reduction was not evident in the study. (AU/SWF)

ACC# : L001226
AUTHOR: Coble, L.W.
AFFIL : Community Hygiene Section, Dorchester County Health Department, Cambridge, MD
TITLE : Influence on Groundwater from the Bermed Infiltration Pond
SOURCE: Journal of Environmental Health, 44(1):27-31 (5 pages)
YEAR : 1981
TEXT : A bermed infiltration pond is a feasible alternative to subsurface drainfields of conventional soil absorption systems in areas experiencing high groundwater conditions. Pretreated household wastes, either by a septic tank - sand filtration system or an aerobic treatment unit, are pumped to the pond for final treatment. Water evaporation and infiltration are regulated by environmental and seasonal factors. A field study in Maryland noted the absence of patho[illegible]nic bacteria and nitrate nitrogen in the groundwater outside of the pond excavation. Movement of chlorides and phosphorus in the groundwater was observed at distances approximately 150 feet from the pond. The author notes that the site and location of the bermed infiltration pond is critical in preventing contamination of water supply systems. (SWF)

ACC# : L001227
AUTHOR: Wolverto, B.C., McDonald, R.C.
AFFIL : National Aeronautics and Space Administration, National Space Technology Laboratories, NSTL Station, Mississippi 39529
TITLE : Water Hyacinth (Eichhornia Crassipes) Productivity and Harvesting Studies
SOURCE: Economic Botany, 33(1):1-10 (10 pages)
YEAR : 1980
TEXT : Water hyacinth growth rates were monitored from May through October in two sewage lagoons with different nutrient loading rates. The lagoon receiving the heaviest load sustained the highest average growth rates throughout the summer. The lightly loaded lagoon averaged a 29 percent increase in weight per week over the six month period with the highest growth rate occuring during June with an average weekly weight gain of 71 percent. The heavily loaded lagoon sustained an average growth rate of 46 percent per week for the same six month period with the highest measured growth rate of 73 percent increase in weight per week also occuring in June. In addition, the performance of three harvesters was evaluated. One harvester, consisting of a chopper and conveyor, was capable of picking up and chopping approximately 2.3 t of plants per hour and delivering them to a waiting truck. The second harvester was a single 1.52 m (5 ft.) wide conveyor, and the third one was a modified clamshell bucket attached to a dragline. The average harvesting rate of each of these harvesters was approximately 9.3 t of water hyacinths per hour. (AU)

ACC# : L001228
AUTHOR: Landry, E.F., Vaughn, J.M., Pennello, W.F.
AFFIL : Department of Energy and Enrionement, Brookhaven National Laboratory, Upton, New York 11973
TITLE : Poliovirus Retention in 75-cm Soil Cores After Sewage and Rainwater Application
SOURCE: Applied and Environmental Microbiology, 49(6):1032-1038 (7 pages)
YEAR : 1980
TEXT : Poliovirus retention in 75-centimeter in-situ soil cores was determined following sewage effluent and rainwater appliction. The soil cores were inoculated with seeded sewage effluent at a 1-cm/hour infiltraton rate and analyzed for plaque-forming units at 5-cm intervals. The results indicate that 77 percent of the viruses were absorbed in the top 5-cm of soil and a total of 96 percent of the viruses were found in 25-cm. Less than one percent of the viruses were found in core filtrates. Localized movement of viruses was observed after application of a single sewage effluent or rainwater rinse, with greatest movement in the rainwater rinsed soil cores. Reabsorption of the mobilized viruses was noted at lower core depths. (SWF)

ACC# : L001229
AUTHOR: Anderson, E.L., Pepper, I.L., Kneebone, W.R.
AFFIL : Department of Soils, Water Engineering, and Department of Plant Sciences, University of Arizona, Tucson
TITLE : Reclamation of Wastewater with a Soil-Turf Filter--1: Removal of Nitrogen
SOURCE: Journal WPCF, 53(9):1402-1407 (6 pages)
YEAR : 1981
TEXT : A study was conducted at the University of Arizona Turfgrass Research Center to determine the maximum application rate of secondary treated wastewater to a soil-turf filter without harming the turf and yielding leachate averaging less than 10 mg/l nitrate-nitrogen. Five application rates of secondary treated effluent were applied to plots of two soil-types seeded with turfgrass. The results indicate that the soil containing a higher percentage of silt and organic matter was capable of removing more wastewater nitrogen by soil processes and turf growth. A large amount of groundwater recharge at higher application rates was obtained on the silt organic matter soil than on the second test soil (containing less silt and no organic matter) while still meeting federal nitrogen standards. (SWF)

ACC# : L001230
AUTHOR: Iskandar, I.K., Syers, J.K.
AFFIL : U.S. Army Cold Regions Res. and Eng. Lab., Hanover, NH
TITLE : Effectiveness of Land Application for Phosphorus Removal from Municipal Wastewater at Manteca, California
SOURCE: Journal of Enviornmental Quality, 9(4):616-621 (6 pages)
YEAR : 1980
TEXT : The concentrations of dissolved inorganic phosphate (DIP) in soil solution collected at 0.8 and 1.6 m in soils which had received municipal waste water for 4 and 13 years ranged from 7.3 to 13.9 micrograms/liter. In some cases, these concentrations were higher than that in the added wastewater. Surplus studies

indicated that the ability of soils from the control site to remove added P from solution was low. Wastewater addition caused a substantial decrease in the P sorption capacity of surface soils. Only a small proportion of the total P accumulated from wastewater addition was in the organic form. Although lack of crop removal of P and a high infiltration rate may be partly responsible for the poor performance of the Manteca system in terms of P removal from wastewater, the very low P sorption capacity of the soil is regarded as the major factor. (AU)

ACC# : L001231
AUTHOR: Gould, M., Epstein, E., Alpert, J.E.
AFFIL : E & A Environmental Consultants, Inc., Sharon, Massachusetts
TITLE : A Practical Look at Sludge Composting
SOURCE: Public Works, 112(10):76-79 (4 pages)
YEAR : 1981
TEXT : A sludge composting system suitable for small or large municipalities is described. The aerated static pile process involves a sludge-bulking agent mixture placed on perforated air pipes. Air is drawn through the pipes by blowers and exhausted through a filter pile of finished compost for deodorization. Stabilized compost is produced in 60 days. Bulking material used in the process includes wood chips, bark, leaves, straw and shredded tires. A step-by-step plan to develop a municipal composting program is included. (SWF)

ACC# : L001232
AUTHOR: Enferadi, K.M.
AFFIL : California Department of Health Services, Sanitary Engineering Section, Berkeley, CA 94704
TITLE : A Field Evaluation of the Waterless Toilet as an Alternative to the Failing Soil Absorption System
SOURCE: Individual Onsite Waterwater Systems - Proceedings of the Eighth National Sanitation Foundation Conference, Ann Arbor, MI (20 pages)
YEAR : 1981
TEXT : The California State Department of Health Services has investigated the use of segregated wastewater treatment systems as an alternative to traditional septic tank - soil absorption systems. Segregated systems are those which separate toilet or "black" wastes from the rest of the household wastes for treatment and disposal. A combination of a black waste composting toilet and a greywater treatment system is usually requested by county health officials in lieu of, or as a replacement for, a failing traditional alternative. The department developed a field project designed to focus on performance characteristics, operational and maintenance problems, and health risks for seven common types of black waste composting systems and three types of greywater treatment. The results of laboratory and site observations from 34 toilets and 9 greywater units installed in private homes in California for an 11-month period are discussed. (SWF)

ACC# : L001233
AUTHOR: De Jong, R., Shaykewich, C.F.
AFFIL : Land Resource Research Institute Agriculture Canada, Ottawa, Ontario; and Department of Soil Science, University of Manitoba, Winnipeg, Man.
TITLE : A Soil Water Budget Model with a Nearly Impermeable Layer
SOURCE: Can. J. Soil Science 61:361-371 (11 pages)
YEAR : 1981
TEXT : A soil water budget model which accounted for a nearly impermeable layer in the profile was developed to describe the water content in a non-homogeneous soil-root system. Water uptake by the roots was represented by a sink term which was dependent upon the root distribution, the soil water content and the potential transpiration. The chosen boundary conditions, precipitation, evapotranspiration and a nearly impermeable layer at the bottom of the soil profile approximated those existing in the field. A submodel to calculate interception was included in the model. Data obtained from a field experiment on a clay soil were compared with calculated results for the period 1 May to 30 Sept. 1975. The overall agreement between daily measured and calculated soil water contents was excellent; all calculated values fell within 10 percent of the measured data. The model also yielded acceptable results in predicting the distribution of soil water through the profile. (AU)

ACC# : L001234
AUTHOR: Seabloom, R.W., Carlson, D.A., Engeset, J.
AFFIL : Department of Civil Engineering, University of Washington, Seattle, Washington
TITLE : Individual Sewage Disposal Systems
SOURCE: Department of Civil Engineering, University of Washington, Seattle, Washington

YEAR : 1981
TEXT : Residences in western Washington which were experiencing on-site wastewater disposal system failure were selected for installation of innovative disposal systems. These systems were installed to correct malfunctioning soil absorption units of conventional septic tank - soil absorption systems. The alternative methods studied included mound systems, anaerobic filter systems, inverted drainfield units, drainfield rejuvenation with hydrogen peroxide, aerobic and anaerobic treatment units and evapotranspiration systems. The results of the on-site study of the innovative systems is presented along with recommendations for further research in alternative wastewater disposal methods. (SWF)

ACC# : L001235
AUTHOR: Parker, C.E.
AFFIL : Dept. of Civil Engineering, University of Virginia, Charlottesville, VA
TITLE : Treatment of Water Closet Flush Water for Recycle and Reuse
SOURCE: Fifty-fourth Annual Conference of the WPCF, Detroit, Michigan, October 4-9, 1981 (33 pages)
YEAR : 1981
TEXT : A full-scale biological/physical treatment system was evaluated to determine its efficiency in the closed-loop treatment of water closet wastewater for recycle and reuse. Wastewater was treated by extended aeration followed by granular media filtration and chlorination. Filtered water stored in a post filter basin was used as the supply to a hydropneumatic tank that operated the water closets. Results indicate that an acceptable flush water could be maintained at 95 percent recycle. The treated wastewater was odor-free and possessed acceptable wastewater characteristics. (SWF)

ACC# : L001236
AUTHOR: Shoupp, W.J., Dingess, J.M., Moe, P.G.
AFFIL : Water Research Institute, Center for Extension and Continuing Education, West Virginia Universiy
TITLE : Microbial Purification of Recycled Wastewater in a Closed System
SOURCE: Water Research Institute, West Virginia University, Information Report 15 (57 pages)
YEAR : 1981
TEXT : A recycling sanitary-waste disposal system was developed and tested in the laboratory by using a synthetic fecal-urinous waste material. The system consisted of an aerobic digestion tank, a baffled settling tank, a cellulose-fiber filter, an ultraviolet-light disinfecting unit, and a resevoir tank. The system was found to be capable of supporting an aerobic microbial population with an organic loading rate equivalent to the waste produced by three adult-persons per day by utilizing an aeration rate of 12 liters of air per minute. Increasing the temperature of the digestion tank from 23 C to 34 C reduced the rates of sludge and ammonia-nitrogen accumulation but had little effect on BOD-reduction efficiency. Reducing retention time of the waste in the digestion tank increased the rate of mineral-salt accumulation but had no deleterious effect on the microbial population during an eight-week experimental period. Shock loads of up to seven times the normal feed rate caused temporary perturbations of the system, but in general, the microbial population in the system showed remarkable stability and rapid recovery power. Indicator organisms, used to test the survivability of pathogenic organisms, were unable to establish themselves in the microbial population in the system and perished within a few hours. This indicated that no serious health hazards would be associated with the use of such a system in a private home. The BOD reduction efficiency of the system was generally better than 85 percent and the total carbon lost from the system in the form of carbon dioxide was better than 95 percent. The main limiting factors were found to be inadequate aeration and rate of mineral-salt accumulation. (AU)

ACC# : L001237
AUTHOR: Wightman, D., Zirschky, J.H., George, D.B., Filip, D.S.
AFFIL : CH2M Hill, Portland, Oregon; Ecology and Environment, Kansas City, Missouri; LCC Institute of Water Research, Lubbock, Texas; and Utah State Bureau of Water Pollution Control, Salt Lake City, Utah
TITLE : High Rate Overland Flow
SOURCE: National Science Foundation, Washington, DC, (33 pages)
YEAR : 1981
TEXT : A study was conducted at an experimental overland flow site in Utah to evaluate system performance at various wastewater loading rates. Wastewater was applied eight hours a day, five days per week at hydraulic loading rates from 13 cm/wk to 57 cm/wk at two, five-month test periods. The plots had a foundation of clay subsoil with a clay loam topsoil and a cover crop consisting of a mixture of rye, fescue and bluegrass. Results from the study indicate a greater than 90 percent reduction in BOD and suspended solids with nitrogen removal ranging from 70-90 percent. Loading rate had no effect on overland flow runoff BOD

concentrations. (SWF)

ACC# : L001238
AUTHOR: Hurst, C.H., Gerba, C.P., Lance, J.C., Rice, R.C.
AFFIL : Department of Virology and Epidemiology, Baylor College of Medicine, Houston, TX 77030
TITLE : Survival of Enteroviruses in Rapid-Infiltration Basins During the Land Application of Wastewater
SOURCE: Applied and Environmental Microbiology, 40(2):192-200 (9 pages)
YEAR : 1980
TEXT : Field studies were conducted in Arizona to measure the downward movement through soil of seeded enterovirus during rapid infiltration of sewage effluent. The inactivation rate of the enterovirus during periods of flooding and drying in the rapid infiltration basins was determined. Plastic tubes containing the seeded enterovirus and soil were buried at four depths in the basin, and five samples over a 24-day period were taken for analyses. The downward migration through soil of seeded poliovirus type 1 was greater than that of echovirus type 1. Enterovirus inactivation rate was dependent upon soil moisture loss in the basin. The inactivation rate was increased when the basin soil was permitted to dry between effluent application periods. This procedure has application in preventing high virus levels in the soil and averting possible groundwater contamination. (SWF)

ACC# : L001239
AUTHOR: MacGregor, S.T., Miller, F.C., Psarianos, K.M., Finstein, M.S.
AFFIL : Dept. of Environmental Sciences, Cook College, Rutgers University
TITLE : Composting Process Control Based on Interaction Between Microbial Heat and Output and Temperature
SOURCE: Applied and Environmental Microbiology, 41(6):1321-1330 (10 pages)
YEAR : 1981
TEXT : Rational composting process control involves the interrelated factors of heat output, temperature, ventilation, and water removal. These relationships were implemented in a field-scale process of static-pile configuration, using a mixture of sewage sludge and wood chips. Heat removal was matched to heat output through a temperature feedback control system, thereby maintaining biologically favorable temperatures. The observations indicate that, fundamentally, there are two kinds of composting systems: those that are and those that are not temperature self-limiting. The self-limiting system reaches inhibitive temperatures which debilitate the microbial community, suppressing decomposition, heat output and water removal. In contrast, non-self limiting temperatures support a robust community, promoting decomposition, heat output and water removal. (AU)

ACC# : L001240
AUTHOR: Palsgaard, J.
AFFIL : Merced County Department of Health Division of Environment Health, Merced, California
TITLE : Formation and Operation of Maintenance Districts for Sewage Disposal
SOURCE: On-site Sewage Treatment - Proceedings of the Third National Symposium on Individual and Small Community Sewage Treatment 1981, American Society of Agricultural Engineers, St. Joseph, Michigan (6 pages)
YEAR : 1982
TEXT : Describes a county-operated on-site wastewater management district in Merced County, California, including its formation, operation, design, inspections, monitoring, system repair, billing procedures, fees and special problems. Annual fee per lot ranges from $20 to $25. Alternating deep-trench systems which use sidewall infiltration are used for all managed on-site systems. All systems are designed for easy septic tank and trench operation inspection. (AU/SWF)

ACC# : L001241
AUTHOR: Polprasert, C., Rajput, V.S., Donaldson, D., Viraraghavan, T.
AFFIL : Environmental Sanitation Information Center, Bangkok, Thailand
TITLE : Septic Tank and Septic Systems
SOURCE: Environmental Sanitation Information Center, Asian Institute of Technology, P.O. Box 2754, Bangkok, Thailand (115 pages)
YEAR : 1982
TEXT Reviews the septic tank and septic system. Topics include a description of wastewater characteristics; septic tank performance, design and construction; disposal of septic tank effluent; disposal and management of septage; the efficiency of soil materials in removing pollutants; the environmental effects of septic tank systems, including chemical, nutritive and biological contamination; and recommendations for research on septic systems. Provides a glossary of technical terms and references. (SWF)

ACC# : L001242
AUTHOR: Englehardt, J.D., Ward, R.C.
AFFIL : Agricultural and Chemical Engineering Dept., Colorado State University, Fort Collins, Colorado
TITLE : Technical Management Needs for Small Flows Technology
SOURCE: On-site Sewage Treatment - Proceedings of the Third National Symposium on Individual and Small Community Sewage Treatment 1981, American Society of Agricultural Engineers, St. Joseph, Michigan (9 pages)
YEAR : 1982
TEXT : Describes a procedure which identifies and organizes the operation and maintenance requirements for on-site wastewater treatment technology from a community management perspective. The requirements considered are the procedures, the resources and the costs involved. The study is divided into three phases. Phase one is the definition of theoretical requirements for technical management. Phase two is the determination of current operation and maintenance practices and results. Phase three is the development of realistic operation and maintenance recommendations and costs embodied in a computer program. (AU/SWF)

ACC# : L001243
AUTHOR: Jarrett, A.R., Fritton, D.D., Sharpe, W.E.
AFFIL : Department of Agricultural Engineering, Department of Agronomy, School of Forest Resources, The Pennsylvania State University, University Park, Pennsylvania
TITLE : Alternative On-Lot Trench System with Dosing and Water Conservation
SOURCE: On-site Sewage Treatment - Proceedings of the Third National Symposium on Individual and Small Community Sewage Treatment 1981, American Society of Agricultural Engineers, St. Joseph, Michigan (10 pages)
YEAR : 1982
TEXT : The study concluded that small, carefully designed dosed alternate trenches can be used with water conservation to provide disposal of septic tank effluent for periods during which an existing but malfunctioning absorption field is rested. The infiltration rate of a malfunctioning absorption system can be rejuvenated by complete resting for 10 months if the system has failed due to a biological clog layer. However, the permanence of such rejuvenation has not been established. (AU/SWF)

ACC# : L001244
AUTHOR: Ryland, L.N.
AFFIL : Greenhorne & O'Mara, Inc., Riverdale, MD
TITLE : Put Pressure on Sewage
SOURCE: Journal of Environmental Economics and Management, 9(2):47-48 (2 pages)
YEAR : 1982
TEXT: Discusses septic tank effluent pump (STEP) and grinder pump (GP) systems as cost-effective alternatives to gravity sewers. Factors that must exist for proper operation of the STEP system include 1) an intact septic tank, 2) properly working baffles or inlet devices, and 3) regular maintenance and inspection of the septic tank. The GP system offers the advantages of 1) eliminating reliance on septic tanks, 2) less environmental disruption of the property, and 3) less odor problems associated with the aerobic system. Includes a case study of a Maryland sanitary district which utilized GP systems as a cost-effective method of providing sanitary service to rural areas. (AU/SWF)

ACC# : L001245
AUTHOR: Rich, L.G.
AFFIL : Environmental Systems Engineering, Clemson, University, Clemson, SC
TITLE : Low-Cost Treatment of Wastewater
SOURCE: Public Works, 113(6):52-54
YEAR : 1982
TEXT: Dual-power level, multicellular aerated lagoon systems and benthal stabilization ponds may be used as low-cost treatment alternatives for wastewater. Discusses aeration equipment and aeration requirements for lagoon systems and stabilization ponds, and includes graphs necessary for design of the lagoons and ponds. (AU/SWF)

ACC# : L001246
AUTHOR: Flowers, J.E.
AFFIL : U.S. EPA, Washington, DC
TITLE : Management of Onsite Wastewater Treatment Systems
SOURCE: On-site Sewage Treatment - Proceedings of the Third National Symposium on Individual and Small Community Sewage Treatment 1981, American Society of Agricultural Engineers, St. Joseph, Michigan (10 pages)
YEAR : 1982
TEXT : Presents a method for conceptual development of an on-site management program within the framework of a 201 facilities plan. The first step is to evaluate any existing on-site management agencies and programs. A checklist is provided for analyzing each agency's functional responsi-

bilities. The paper discusses how to determine management program needs and ends with a discussion of management considerations in onsite systems alternatives development, thus helping to answer the questions who, how, and how much. (AU/SWF)

ACC# : L001247
AUTHOR: Converse, J.C., Otis, R.J.
AFFIL : Civil and Environmental Engineering Dept., Small Scale Waste Management Project, College of Agriculture and Life Sciences, University of Wisconsin, Madison, Wisconsin
TITLE : Field Evaluation of Pressure Distribution Networks
SOURCE: On-site Sewage Treatment - Proceedings of the Third National Symposium on Individual and Small Community Sewage Treatment 1981, American Society of Agricultural Engineers, St. Joseph, Michigan (7 pages)
YEAR : 1982
TEXT : Ten field-installed pressure distribution network systems were evaluated to determine if the design procedures and assumptions were adequate. The field data show much variability, but the design model appears to be a reasonable design tool if the lateral length is kept to less than 80 percent of the maximum design length permitted by the model. Seven of the ten systems yielded distal pressures greater than the minimum recommended pressure. Model sensitivity needs to be examined for changes in the Hazen Williams friction factor, orifice coefficients and minor pressure losses. (SWF)

ACC# : L001248
AUTHOR: Carlile, B.L., Osborne, D.J.
AFFIL : Soil Science Dept., North Carolina State University
TITLE : Some Experience with Gravel-Less Systems in Texas Coastal Areas
SOURCE: On-site Sewage Treatment - Proceedings of the Third National Symposium on Individual and Small Community Sewage Treatment 1981, American Society of Agricultural Engineers, St. Joseph, Michigan (10 pages)
YEAR : 1982
TEXT : Three different types of gravel-less systems are installed, inspected and evaluated. The following conclusions are drawn from this project. The percolation test alone is not adequate for a site evaluation. Subsurface distribution laterals should always be installed as shallow as possible and parallel to the contour of the slope. Individual distribution lines should be no longer than 21m (70 ft) long. Further improvements in design and installation of the alternative systems will be necessary. The use of a gravel envelope around distribution laterals may be necessary. (AU/SWF)

ACC# : L001249
AUTHOR: Mancl, K., Beer, C.E., Patterson, S.
AFFIL : Agricultural Engineering Department, Iowa State University and Guthrie County, Iowa
TITLE : A Case Study of the Lake Panorama Management District
SOURCE: On-site Sewage Treatment - Proceedings of the Third National Symposium on Individual and Small Community Sewage Treatment 1981, American Society of Agricultural Engineers, St. Joseph, Michigan (4 pages)
YEAR : 1982
TEXT : The 201 facilities planning process is a systematic method for identifying, evaluation and selecting alternative wastewater systems to meet the water quality management needs for a community in a cost-effective manner. The facilities planning process is described within the following framework: 1) assessing the existing situation, 2) problem assessment, 3) technology evaluation, 4) alternative development and evaluation, 5) alternative selection, and 6) implementing arrangements. An onsite management functional responsibilities checklist is provided. (AU/SWF)

ACC# : L001250
AUTHOR: Stewart, L.W., Reneau, R.B.
AFFIL : Dept. of Agronomy, Virginia Polytechnic Institute and State University, Blacksburg, Virginia
TITLE : Movement of Fecal Coliform Bacteria from Septic Tank Effluent Through Coastal Plain Soils with High Seasonal Fluctuating Water Tables
SOURCE: On-site Sewage Treatment - Proceedings of the Third National Symposium on Individual and Small Community Sewage Treatment 1981, American Society of Agricultural Engineers, St. Joseph, Michigan (9 pages)
YEAR : 1982
TEXT : Summarizes bacterial movement through soil with high seasonal fluctuating water tables. The "in-situ" movement of fecal coliforms are monitored in these studies by the placement of piezometers at selected distances from the drainfields. Soils were divided into four categories: 1) soils with perched water tables, 2) soils with water tables influenced by tile drainage, 3) soils with widely fluctuating water tables and, 4) soils with high fluctuating water tables and alternative systems. (SWF)

ACC# : L001251
AUTHOR: Hill, P.E., Graves, R.E.
AFFIL : Franklin County Extension Service, Greenfield, Massachusetts and Consulting Agricultural Engineer, Northfield, Massachusetts
TITLE : Application of Septage to Agricultural Land
SOURCE: On-site Sewage Treatment - Proceedings of the Third National Symposium on Individual and Small Community Sewage Treatment 1981, American Society of Agricultural Engineers, St. Joseph, Michigan (4 pages)
YEAR : 1982
TEXT: The first two years of a study concerning septage application to farmland consisted of site selection, land application and the subsequent analysis of soil and plant materials. The use of septage on agricultural land is a viable method of septage disposal. Odor and groundwater pollution, however, are problems with land application. Test results from soil and corn have not been completed yet. (SWF)

ACC# : L001252
AUTHOR: Kolega, J.J., Morton, B.L., Herzig, W., Curtis, R., Cunningham, E.A.
AFFIL : Agricultural Engineering Department, University of Connecticut, Storrs, Connecticut, State of Connecticut, Department of Environmental Protection, Water Compliance Unit, Hartford, Connecticut, and Environmental Engineer, Connecticut 209 Program
TITLE : Groundwater Quality Studies at Connecticut Land Septage Disposal Facilities
SOURCE: On-site Sewage Treatment - Proceedings of the Third National Symposium on Individual and Small Community Sewage Treatment 1981, American Society of Agricultural Engineers, St. Joseph, Michigan (15 pages)
YEAR : 1982
TEXT : Describes groundwater monitoring programs for septage lagoon effluent migration at four stratified drift sites and at one glacial till site in Connecticut. A brief soil description of each site is given. Monitoring wells are located hydraulically upgradient to establish site background parameters and hydraulically downgradient to detect lagoon effluent migration. The water quality data from the septage disposal sites are summarized in table form. (SWF)

ACC# : L001253
AUTHOR: Rubin, A.R., Cogger, C.G.
AFFIL : Biological and Agricultural Engineering Dept., Soil Science Dept., North Carolina State University
TITLE : Effect of Extreme Water Conservation on the Characteristics and Treatability of Septic Tank Effluent
SOURCE: On-site Sewage Treatment - Proceedings of the Third National Symposium on Individual and Small Community Sewage Treatment 1981, American Society of Agricultural Engineers, St. Joseph, Michigan (6 pages)
YEAR : 1982
TEXT: Describes a method for handling a waste load from septic tanks receiving concentrated wastes from low-flush toilets. Hydraulic loads were reduced by 68-72 percent with the installation of air-assist toilets and spring-loaded faucets. Additional settling time may be required where extreme water conservation measures are employed. After a 6.4-day retention time, effluent COD was below that expected for a conventional system. Those pollutants which were in solution in the effluent after sufficient septic tank retention are readily treated in the soil system. (AU/SWF)

ACC# : L001254
AUTHOR: Moe, P.G., Shoupp, W.J., Dingess, J.M.
AFFIL : Professor, Division of Plant and Soil Sciences, West Virginia University, Morgantown, WV, Research Assistant, Pittsburgh, PA, and Graduate Research Assistant, School of Law, University of North Dakota, Grand Forks, ND
TITLE : Microbial Ecology of an Aerobic Recycling Onsite Treatment Plant
SOURCE: Individual Onsite Wastewater Systems - Proceedings of the Sixth National Conference, 1979, Ann Arbor Science Publishers, Inc., Ann Arbor, MI, (39 pages)
YEAR : 1980
TEXT : Exploratory research studied the effect that various operating parameters of a laboratory recycling waste disposal system have on its microbial population. The independent variables include organic feedrate, aeration rate, temperature and retention time. The system operates more efficiently at a loading of three persons per day than at one or two persons per day. Aeration requirements increased in proportion to the organic loading rates. Small changes of temperature within the mesaphyllic range have minimal effect on the operation of the system. Reducing the retention time in the digestion tank by reducing the volume of mixed liquor in the tank results in the predictable effect of increasing the accumulation rate of residuals. Coliforms introduced into the digestion tank as indicators of pathogenic survivability are unable

to establish themselves within the microbial population of the tank. Although shock loadings produce brief perturbations, the overall stability of the system is quickly reestablished. The microbial population of the system exhibits an amazing resiliency and is able to survive over a wide range of conditions. There are a number of engineering improvements that could be made to improve the operation of the system and the filtering device. (AU/SWF)

ACC# : L001255
AUTHOR: Carlile, B.L.
AFFIL : Soil Science Department, North Carolina State University, Raleigh, North Carolina
TITLE : Use of Shallow, Low-Pressure Injection Systems in Large and Small
SOURCE: Individual Onsite Wastewater Systems - Proceedings of the Sixth National Conference, 1979, Ann Arbor Science Publishers, Inc., Ann Arbor, MI, (15 pages)
YEAR : 1980
TEXT : Describes design and application of a low-pressure pipe effluent (LPP) distribution system in North Carolina soils. An LPP is a network of small-diameter perforated pipes placed in natural soil trenches 10-18 inches deep by 5-12 inches wide. Septic tank effluent is pumped through the LPP in controlled doses for uniform distribution. Components are listed. Conditions for which LPP has proved effective include rapidly permeable sands, high water table soils, sites with shallow restrictive horizons, steep slopes, and large flows. A step-by-step sequence is provided for sizing, layout, and distribtuion system design. This system is an alternative for problem areas not served by public treatment facilities. (AU/SWF)

ACC# : L001256
AUTHOR: Hart, S.W.
AFFIL : Texas Department of Health, Austin, Texas
TITLE : Pressurized Subsurface Effluent Dosing - The Texas Experience
SOURCE: Individual Onsite Wastewater Systems - Proceedings of the Sixth National Conference, 1979, Ann Arbor Science Publishers, Inc., Ann Arbor, MI, (13 pages)
YEAR : 1980
TEXT : The Pressurized Subsurface Effluent Dosing (PSED) method of disposing domestic wastewater effluent was installed in a subdivision near Houston, Texas. The PSED process consists of pumping treated effluent through small-diameter perforated pipe into an enclosed (covered) trench. Dosing is accomplished by a low pressure pump; controls are provided to turn the pump on and off and for an alarm in case of system malfunction. The greatest advantage of the PSED process is low cost of materials and installation. The major disadvantage is high operation and maintenance costs. PSED design criteria are stressed, including trench construction and sizing, and pump sizing and pumping specifications. Conditions inducing PSED system failure are rated. (SWF/AU)

ACC# : L001257
AUTHOR: Palmenberg, R.E.
AFFIL : Gutierrez-Polimenberg, Inc., Phoenix, Arizona
TITLE : Calculator Program Aids Lagoon Design
SOURCE: Water/Engineering & Management, October 1981, p. 48-52 (2 pages)
YEAR : 1981
TEXT : A program written for programmable calculators gives a trial-and-error solution to earthwork volumes for lagoon construction. It provides a depth of cut, cut volume, fill volume and net earthwork volume for the balanced cut-and-fill construction approach. A procedure is worked out specifically for the lagoons sharing a common center environment. (SWF)

ACC# : L001258
AUTHOR: Parker, W.F., Mee, B.J.
AFFIL : Dept. of Microbiology, University of Western Australia, Western Australia, 6009, Australia
TITLE : Survival of Salmonella Adelaide and Fecal Coliforms in Coarse Sands of the Swan Coastal Plain, Western Australia
SOURCE: Applied and Environmental Microbiology, May 1982, (6 pages)
YEAR : 1982
TEXT : The survival of "Salmonella adelaide" and fecal coliforms in two coarse sands influenced by two sources of septic tank effluent was studied. The experiments were conducted in conditions that reflected the soil environment beneath functioning septic tank systems. Significant differences in survival were found with different effluent sources. In one experiment the survival of "Salmonella adelaide" was similar to that of fecal coliforms; in the other it was not. The nonuniform, multiphasic nature of survival curves and variability observed in these experiments suggests that the application of such survival data for establishing

management criteria for septic tank systems - by, for example, the use of soil moisture characteristic curves to give estimates of movement in the soil - is inappropriate. (AU)

ACC# : L001259
AUTHOR: Fielding, M.B.
AFFIL : Applied Sciences Section, Pollution Control Branch, Ontario Ministry of the Environment, Toronto, Ontario, Canada
TITLE : Ground Water Monitoring Under Leaching Field
SOURCE: On-Site Sewage Treatment - Proceedings of the Third National Symposium on Individual and Small Community Sewage Treatment 1981, American Society of Agricultural Engineers, St. Joseph, Michigan (8 pages)
YEAR : 1982
TEXT : Three equations derived from Darcy's Law are compared against test results concerning groundwater mounding below a leaching bed. The maximum use of the water table under a leaching bed, the use of the water table under a leaching bed with time and the shape of the groundwater mound are predicted. The accuracy of these predictions are dependent on the accuracy in determining true and representative values for flow, the coefficient of permeability, the depth of the aquifer and the effective porosity. (SWF)

ACC# : L001260
AUTHOR: Lee, M.K.
AFFIL : Otter Tail County, Fergus Falls, Minnesota
TITLE : Design and Installation of Small Community Systems
SOURCE: Individual Onsite Wastewater Systems - Proceedings of the Sixth National Conference, 1979, Ann Arbor Science Publishers, Ann Arbor, MI, (9 pages)
YEAR : 1980
TEXT : To protect a lake and water wells from pollution under terms of Minnesota's Shoreland Management Act, a common drainfield was built to treat the effluent collected from individual septic tanks serving a dozen lakefront dwellings. Each tank discharges to a gravity flow trunk line leading to a pump station which then pumps to the drainfield. Details of system design, site selection and cost are provided along with a brief discussion of other operating community effluent collection systems. (SWF)

ACC# : L001261
AUTHOR: NA
AFFIL : NA
TITLE : Facilities Planning Study: Final Report
SOURCE: Puerto Rico Aqueduct and Sewer Authority, San Juan, Puerto Rico
YEAR : 1980
TEXT : This is the final report of a facility planning study to develop cost-effective innovative and alternative wastewater technologies for a 0.69 square mile rural area in eastern Puerto Rico characterized by steep slopes, poor soil conditions and public health problems caused by inadequate wastewater disposal practices. Physical and human factors and expected future developments are summarized. Management alternatives are analyzed and a management plan is proposed. Preliminary design criteria are provided for STEP collection systems, cluster soil absorption fields, and hyacinth lagoons, issues affecting implementation of the plan are discussed, and public participation activities summarized. (SWF)

ACC# : L001262
AUTHOR: Mitchell, D.T., Mote, C.R., Rutledge, E.M., Scott, H.D.
AFFIL : Civil Engineering Dept., Agricultural Engineering Dept., Agronomy Dept., University of Arkansas, Fayetteville, Arkansas
TITLE : Soil Column Comparison of Aerobically Pretreated Wastewater to Septic Tank Effluent
SOURCE: On-Site Sewage Treatment - Proceedings of the Third National Symposium on Individual and Small Community Sewage Treatment 1981, American Society of Agricultural Engineers, St. Joseph, Michigan (7 pages)
YEAR : 1982
TEXT : Describes a laboratory study to compare the clogging of septic tank effluent and aerobic effluent. Three-inch soil columns with six different uniformity coefficients were packed and their percolation rate determined. Loading rates were determined from these percolation rates. Results include the time to failure at various multiples of the design loading rate and the time to recover. (SWF)

ACC# : L001263
AUTHOR: Scherer, B.P., Mitchell, D.T.
AFFIL : Texas Eastern and University of Arkansas
TITLE : Individual Household Surface Disposal of Treated Wastewater Without

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          Chlorination
SOURCE: On-Site Sewage Treatment - Proceedings of the Third National Symposium
          on Individual and Small Community Sewage Treatment 1981, American
          Society of Agricultural Engineers, St. Joseph, Michigan (8 pages)
YEAR   : 1982
TEXT   : A sand filter has been designed to allow surface disposal of treated
          wastewater by lawn sprinkling.  Capabilities and design of the system
          are discussed.  The effluent has the clarity of drinking water, the
          bacteriological quality of a water supply, more nitrogen and phosphorus
          than most runoff waters, and less oxygen demand than land and urban
          runoff.  The filter will discharge non-average coliform concentrations
          onto the lawn.  Studies show a rapid decline of the grass surface
          coliform populations on grass contaminated with septic tank effluent.
          Tests of the system did not address virus removal.  (AU/SWF)

ACC#   : L001264
AUTHOR: Hantzsche, NN., Fishman, N.J.,
AFFIL : Bamlit Associates, Berkeley, California and State Coastal Conservancy,
          Oakland, California
TITLE : Mound Systems for Cluster Development
SOURCE: On-Site Sewage Treatment - Proceedings of the Third National Symposium
          on Individual and Small Community Sewage Treatment 1981, American
          Society of Agricultural Engineers, St. Joseph, Michigan (10 pages)
YEAR   : 1982
F2415
TEXT   : Describes a wastewater plan which utilizes community mound systems for a
          large-scale subdivision.  A lot consolidation-redesign alleviates
          environmental land development problems.  The planning and wastewater
          management approach taken here is precedent-setting for California land
          development.  (SWF)

ACC#   : L001265
AUTHOR: Cole, C.A., Sharpe, W.E.
AFFIL : Water Resources Engineering Technology, Capitol Campus, Pennsylvania
          State University, Middletown, PA, and Institute for Research on Land and
          Water Resources, Pennsylvania State University, University Park, PA
TITLE : Impact of Water Conservation on Residential Septic Tank Effluent
          Quality
SOURCE: On-Site Sewage Treatment - Proceedings of the Third National Symposium
          on Individual and Small Community Sewage Treatment 1981, American
          Society of Agricultural Engineers, St. Joseph, Michigan (11 pages)
YEAR   : 1982
TEXT   : Septic tank effluent was monitored to determine the change in effluent
          quality as a consequence of minimum, moderate and maximum water
          conservation.  Concentrations of most septic tank effluent parameters
          were significantly increased in homes after installation of wasteflow
          reduction equipment.  A strong correlation before and after installation
          of wastewater flow reduction hardware between TOC and COD, ammonia-N and
          TKN, and ortho-P and total P showed that simpler tests may be
          substituted in future for investigations of septic tank effluent
          quality.  (AU/SWF)

ACC#   : L001266
AUTHOR: Warnock, R.G., Biswas, N.
AFFIL : Dept. of Civil Engineering, University of Ottawa, Ontario, and Dept. of
          Civil Engineering, University of Windsor, Windsor, Ontario, Canada
TITLE : Study of Columnar Denitrification for Application in an On-Site System
SOURCE: On-Site Sewage Treatment - Proceedings of the Third National Symposium
          on Individual and Small Community Sewage Treatment 1981, American
          Society of Agricultural Engineers, St. Joseph, Michigan (6 pages)
YEAR   : 1982
TEXT   : Kitchen wastewater was used as an external source of organic carbon in
          removing nitrate from synthetic food solution through columnar
          denitrification under laboratory conditions.  A carbon-to-nitrogen ratio
          of 4:1 was found to be sufficient for complete denitrification,
          irrespective of soil depths.  The performance data indicated that the
          soil columns reached steady state conditions within two weeks.  The
          effect of dissolved oxygen present in the feed solutions was
          insignificant.  Less than 20 percent of the excess applied organic
          carbon was recovered.  (AU/SWF)

ACC#   : L001267
AUTHOR: Laak, R.
AFFIL : Civil Engineering Department, University of Connecticut
TITLE : A Passive Denitrification System for On-Site Systems
SOURCE: On-Site Sewage Treatment - Proceedings of the Third National Symposium
          on Individual and Small Community Sewage Treatment 1981, American
          Society of Agricultural Engineers, St. Joseph, Michigan (8 pages)
YEAR   : 1982
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TEXT : The RUCK system is a passive, onsite nitrogen removal technique which requires no more maintenance than a conventional septic tank system. Tests resulted in 81 percent nitrogen removal by biological and passive methods. The RUCK system uses greywater as a carbon source for biological denitrification. Blackwater and greywater are separated: blackwater is run through a septic tank and then a sand bed for bacterial nitrification, and greywater is run through a septic tank. The two waste streams are brought together in an anoxic upflow rock-filled tank where biological denitrification occurs. Laboratory and field results are provided. (SWF)

ACC# : L001268
AUTHOR: Engle, C.F., Hermanson, R.E.
AFFIL : Washington State University, Pullman, Washington
TITLE : Physical Characterization of Fill Materials for On-Site Sewage Systems in Washington
SOURCE: On-Site Sewage Treatment - Proceedings of the Third National Symposium on Individual and Small Community Sewage Treatment 1981, American Society of Agricultural Engineers, St. Joseph, Michigan (11 pages)
YEAR : 1982
TEXT : Seventeen fill systems are examined for signs of success or failure of operation and sampled for laboratory studies. Analyses include size analysis, dense angle of repose, bulk density, saturated hydraulic conductivity, and analysis of shape. The study indicates that Washington Department of Social and Health Services guidelines may be unjustifiably narrowing the range of textures of fill material. A wider range of soil textures may be used as soil properties and handling are understood and care is exercised in installing the systems. (SWF)

ACC# : L001269
AUTHOR: Hantzsche, NN, Neikirk, WT, Wistrom, TV
AFFIL: Ramlit Associates, Berkeley, California, USDA Soil Conservation Service, Bakersfield, California and North Coast Regional Water Quality Control Board Santa Rosa California
TITLE : Soil Textural Analysis for On-Site Sewage Disposal Evaluation
SOURCE: On-Site Sewage Treatment - Proceedings of the Third National Symposium on Individual and Small Community Sewage Treatment 1981, American Society of Agricultural Engineers, St. Joseph, Michigan (10 pages)
YEAR : 1982
TEXT : Describes a procedure which utilizes soil textural analysis as a primary tool for judging site suitability. Comparison of field and laboratory data show a significant correlation between percolation test results and position of soil within defined suitability zones on the textural triangle. In cases of marginal or unacceptable textural classification, wet-weather percolation testing is relied upon as a final determinant of a site's percolation suitability. Although the procedures reduce the dependence on the percolation test, they do not totally eliminate its use as an evaluation tool. (SWF)

ACC# : L001270
AUTHOR: Struchtemeyer, R.A., Black, R.W.
AFFIL : Dept. of Plant and Soil Sciences, University of Maine, Orono, Maine
TITLE : Experiences with Using On-Site Investigations to Size and Design Septic Drain Fields
SOURCE: On-Site Sewage Treatment - Proceedings of the Third National Symposium on Individual and Small Community Sewage Treatment 1981, American Society of Agricultural Engineers, St. Joseph, Michigan (9 pages)
YEAR : 1982
TEXT : Forty sites were selected for monitoring to measure the nutrient removal by gravity-fed drain fields and to test the effectiveness of the Maine Plumbing Code. Conclusions drawn are as follows: Local inspections must be improved. Biological pads caused small beds on coarse textured soils to malfunction. Nutrient concentrations in all cases were highest in water samples collected under and beside the disposal area. Disposal area design needs to have the filter area below the bed revaluated. No pollution was measured in the water taken from lysimeters 15 and 31 meters downslope from beds. (AU/SWF)

ACC# : L001271
AUTHOR: Fritton, D.D., Stahl, J.H., Aron, G.
AFFIL : Dept. of Agronomy and Dept. of Civil Engineering, Pennsylvania State University, University Park, Pennsylvania
TITLE : A Site Evaluation Model for Effluent Disposal
SOURCE: On-Site Sewage Treatment - Proceedings of the Third National Symposium on Individual and Small Community Sewage Treatment 1981, American Society of Agricultural Engineers, St. Joseph, Michigan (7 pages)
YEAR : 1982
TEXT : An interactive computer simulation model assists in evaluating sites for on-site effluent disposal. The computer program is designed around two

categories of information: information required to satisfy legal regulations and information required for water flow models. Revised regulations proposed for use in Pennsylvania are used. The model was developed to improve site suitability decision making, onsite effluent disposal system selection, and soil absorption area sizing decisions. (AU/SWF)

ACC# : L001272
AUTHOR: Nelson, J.D., Ward, R.C.
AFFIL : Agricultural Engineering Dept., Louisiana Tech University and Agricultural and Chemical Engineering Dept., Colorado State University
TITLE : Ground Water Monitoring Strategies for On-Site Sewage Disposal Systems
SOURCE: On-Site Sewage Treatment - Proceedings of the Third National Symposium on Individual and Small Community Sewage Treatment 1981, American Society of Agricultural Engineers, St. Joseph, Michigan (8 pages)
YEAR : 1982
TEXT : A groundwater monitoring program consists of three primary components: determination of sampling location, selection of variables to be monitored, and the selection of the required number of samples (sampling frequency). For groundwater monitoring to support management of onsite systems, the selection of variables and sampling location will be the same regardless of which type of failure detection is being considered; the sampling frequency may vary considerably depending on the specific monitoring objectives. Considerations pertinent to sampling location and water quality variables necessary for proper onsite system management are included. Stress is placed on the necessity of accurately quantifying the input distribution of an individual system before an effective sampling plan can be devised. If the input conditions are unknown, it is difficult to determine whether a particular monitoring strategy is overdesigned or underdesigned. (AU/SWF)

ACC# : L001273
AUTHOR: Hendry, G.S., Leggatt, EA
AFFIL : Ontario Ministry of the Environment, 125 Resources Rd., P.O. Box 213, Rexdale, Ontario, Canada
TITLE : Some Effects of Shoreline Cottage Development on Lake Bacteriological Water Quality
SOURCE: Water Research, 16(7):1217-1222 (6 pages)
YEAR : 1982
TEXT : Eighteen cottaged lakes and one uncottaged lake in Southern Ontario and their inflowing streams were surveyed for bacterial indicators of pollution by membrane filter techniques. Water samples were taken on five consecutive days in the spring, summer, and fall of the year. Inputs of fecal indicator bacteria were determined through an analysis of variance. Fecal coliform and fecal streptococcus levels in lakewater varied in a seemingly erratic manner. When the bacterial densities at different points on the lake were examined by an analysis of variance, the locations with significantly higher densities of fecal coliforms and fecal streptococci were most often found along the cottaged shoreline. Total coliform densities did not show this relationship with the cottaged shoreline. In addition, after rainfall, a large increase in numbers of fecal coliforms was found in the cottaged lakes but not in the uncottaged lake. These findings indicated that the cottaged shoreline was a greater source of fecal indicator bacteria than the uncottaged shoreline. However, the highest concentrations of fecal indicator bacteria in these lakes were found in the inflowing streams. The bacteria in these streams arose from stormwater from undeveloped forested watersheds and were probably of soil or animal origin. (AU)

ACC# : L001274
AUTHOR: Hansel, M.J., Machmeier, R.E.
AFFIL : Minnesota Pollution Control Agency, Roseville, Minnesota, and Agricultural Extension Service, University of Minnesota, St. Paul, Minnesota
TITLE : Public Involvement - The Key to Rule Development and Acceptance
SOURCE: Water Pollution Control Federation 54th Annual Conference, Session 21, October 6, 1981 (30 pages)
YEAR : 1981
TEXT : A Minnesota case history exemplifies that public participation in the early stages of rule development is an excellent way of insuring public participation and a well-accepted onsite system program. The creation of an Advisory Committee and Home Sewage Treatment Workshops provide the opportunities for education, conflict resolution, and grass roots support which are vital to any public relations effort. The paper describes in detail how these three factors facilitate acceptance of rules, regulations, standards and programs. (AU/SWF)

ACC# : L001275

AUTHOR: Ciotoli, P.A., Johnson, G.M., Niehus, D.C.
AFFIL : Roy F. Weston, Inc., West Chester, Pennsylvania, and Municipal Environmental Research Laboratory, U.S. Environmental Protection Agency, Cincinnati, Ohio
TITLE : Role of Public Agencies and Private Interests in Implementing Onsite and Small Community Wastewater Management Programs
SOURCE: Individual Onsite Wastewater Systems - Proceedings of the Sixth National Conference, Ann Arbor Science Publishers, Inc., Ann Arbor, MI, 1979 (16 pages)
YEAR : 1980
TEXT : Provides an overview of wastewater management activities and participation at national, state, regional, and local levels. This report is based on changes which have occurred since the 1977 Clean Water Act Amendments, including increased awareness of noncentral wastewater management issues and changes in construction grants policies affecting onsite, small community, and alternative and innovative systems. Topics covered include planning, research, technical assistance, information transfer, financing, enforcement and O&M. Remaining problems which impair development of noncentral systems are considered along with suggestions of ways to overcome these obstacles. (AU/SWF)

ACC# : L001276
AUTHOR: NA
AFFIL : State of Washington, Department of Ecology and Department of Social and Health Services
TITLE : Design Guidelines for Larger On-Site Sewage Systems with Ultimate Design Capacities of 3,500 Gallons Per Day or More or Serving 10 or More Living Units
SOURCE: State of Washington, Department of Ecology and Department of Social and Health Services (8 pages)
YEAR : 1979
TEXT : Sets forth design criteria for proposed septic tank and drainfield systems with ultimate design capacities of 3,500 gallons per day (gpd) or more, or serving 10 or more living units. Design criteria include 1) soil evaluation and loading rates, 2) soil logs and site inspections, 3) topography 4) flow criteria, 5) drainfield design, 6) land area requirements, and 7) septic tank design. In addition to these design criteria, proposed projects must comply with other procedural requirements including 1) engineering reports, 2) operation and maintenance manual, and 3) construction inspection. (AU/SWF)

ACC# : L001277
AUTHOR: Garcia, W.J., Blessin, C.W, Inglett, G.E., Kwolek, W.F., Carlisle, J.N. Hughes, L.N., Meister, J.F.
AFFIL : Northern Regional Research Center, Agricultural Research, Science and Education Administration, U.S. Dept. of Agriculture, Peoria, IL and Greater Peoria Sanitary District, Peoria, IL and Southern Illinois University, Carbondale, IL
TITLE : Metal Accumulation and Crop Yield for a Variety of Edible Crops Grown in Diverse Soil Media Amended with Sewage Sludge.
SOURCE: Environmental Science and Technology, 15(7):793-804 (12 pages)
YEAR : 1981
TEXT : This study was designed to determine the best uses for sewage sludge, by amending soil materials ranging in scope from disturbed materials such as coal mine gob and sanitary landfill to fully productive agricultural soils. Fifteen crop species were grown in randomized field plots. To assess the possible benefits and risks of sludge use, we studied the following aspects: (1) physical characteristics of the soils as a result of their amendment with sludge, (2) yields for a broad variety of crop species, (3) nutritional quality of selected crops, (4) metal uptake and accumulation in crop tissues, and (5) translocation of metals from soil medium to tissues. Harvested crops with the highest metal contents were derived from landfill and coal mine gob treatments, and the lowest were associated with loam, clay, and agriculturally productive topsoils; a sludge-only treatment consisting of dried sludge as the entire growth medium produced intermediate metal levels in these crops. (AU)

ACC# : L001278
AUTHOR: Evans, B.M.
AFFIL : Development Sciences, Inc., Sagamore, Massachusetts
TITLE : Aerial Sanitary Surveys in Rural Wastewater Planning
SOURCE: Individual Onsite Wastewater Systems - Proceedings of the Sixth National Conference, 1979, Ann Science Publishers Inc., Ann Arbor, MI, (6 pages)
YEAR : 1980
TEXT : Based on experience in nine states, this report proposes the use of air photo surveys to identify possible septic system failures, specifically surface breakout - upward movement of partially treated or untreated wastewater to the soil surface. Development of a photo interpretation key for each geographical area is required. Use of aerial photography as a screening technique greatly reduces the number of locations

requiring ground inspection based on site characteristics. Normal color and color infrared film exposed on scales of 1:10,000 or larger produced the best results. Varying soil color and vegetation, along with tree cover, are factors which limit the use of this screening method. (SWF)

ACC# : L001279
AUTHOR: Constantz, J.
AFFIL : U.S. Geological Survey, 345 Middlefield Road, MS-96 Menlo Park, CA
TITLE : Temperature Dependence of Unsaturated Hydraulic Conductivity of Two Soils
SOURCE: Soil Science Society of America Journal 46(3):466-469 (5 pages)
YEAR : 1982
TEXT : Packed columns of Oakley sand and Hanford sandy loam were used to develop isothermal steady-state fluxes. Soil matric potentials were measured and unsaturated hydraulic conductivities were calculated over a range of matric potentials at 2 degrees, 25 degrees, and 45 degrees centigrade. In addition, water retention characteristics (to-100 kPa) were measured at these same temperatures for both soils. The calculated results are compared to an equation that relates unsaturated conductivity to the intrinsic permeability, the relative permeability, and the viscosity of water. The equation considers viscosity to be the only parameter that changes with temperature. The results show a much greater temperature dependence in the unsaturated conductivity than would be predicted by this equation. The results indicate that the relative permeability may be a function of temperature. The temperature dependence of the soil water matric potential, surface tension, and diffuse double-layer thickness are discussed in terms of their possible interaction with the unsaturated conductivity values obtained. A case is presented for further study to isolate these temperature-sensitive parameters as well as additional parameters related to fluid flow path changes with temperature. (AU)

ACC# : L001280
AUTHOR: Schmidt, H.E.
AFFIL : General Development Corporation, Miami, Florida
TITLE : Private Utility Management of Onsite Services
SOURCE: Individual Onsite Wastewater Systems - Proceedings of the 8th National Sanitation Foundation Conference, 1981, Ann Arbor Science Publishers, Ann Arbor, MI (15 pages)
YEAR : 1981
TEXT : Describes the developmental use of pressure sewers in Florida at locations where gravity sewers are economical and operationally unfeasible. The case study describes how General Development Corporation, a major land developer and community builder in Florida, handled public relations associated with implementing pressure sewer technology. Stresses flushing as a solution to the maintenance problem of sand entering the lines during line breaks. Describes the water-conserving aspect of pressure sewers as an advantage over gravity sewers in arid areas. (SWF)

ACC# : L001281
AUTHOR: Laak, R.
AFFIL : School of Engineering, Department of Civil Engineering, The University of Connecticut, Storrs, Connecticut
TITLE : Influence of Pretreatment on Soil Clogging
SOURCE: Individual Onsite Wastewater Systems - Proceedings of the First National Conference, 1974, Ann Arbor Science Publishers, Ann Arbor, MI (5 pages)
YEAR : 1974

TEXT : Summarizes two years of research on the effect of pretreatment (BOD and suspended solids removal) on soil seepage bed performance in five households without garbage grinders. The objective of pretreatment is to reduce the clogging mat influence. Pretreatment reduces soil clogging material, thus permitting smaller seepage bed installations where soil hydraulic conductivity is not significant. A mature clogging mat shows continual changes in permeability and is desirable for treatments. The mat will not clog to ultimate failure but reaches a long-term equilibrium rate. Toilet wastes contribute 90 percent of the nitrogen, half of the phosphates, and a majority of suspended solids in household sewage. Extensive pretreatment was found to be best suited for very permeable and well-drained soils. (AU/SWF)

ACC# : L001282
AUTHOR: Winneberger, J.H.T.
AFFIL : Consultant
TITLE : Nitrogen, Public Health and the Environment: Some Tools for Critical Thought
SOURCE: Ann Arbor Science Publishers, 230 Collingwood, P.O. Box 1425, Ann Arbor, MI (86 pages)

YEAR : 1982
TEXT : Discusses biological and chemical aspects of nitrogen with a critical overview. The treatise encourages the reader to adhere to scientific principles of proofs and to ignore the tendency to accept what may be believed as obvious. Chapters cover public health significance concerning nitrates, eutrophication, nitrogen budgets and in-field experiences, and laboratory and field experiments on nitrogen in wastewater disposed to a septic tank system. (SWF)

ACC# : L001283
AUTHOR: Foster, R.
AFFIL : Allott and Lomax, Consulting Engineers
TITLE : Sewage Disposal in Developing Countries: Some Thoughts
SOURCE: Water Pollution Control, Part 1, 1980, pp. 28-41, (15 pages)
YEAR : 1980
TEXT : The opening section of this two-part article describes the history of sewage disposal and the development of water carriage systems in the United Kingdom. Methods discussed range from midden heaps and pit privies through modern secondary sewage treatment. The second section discusses the current sewage disposal and water supply system in developing countries and suggests alternatives based on the physical conditions and economic resources of the areas to be served. Article proposes modified versions of some earlier techniques (including dry systems) and outlines systems planned for locations in Saudi Arabia, Ghana and Nigeria. Diagrams of simple treatment systems accompany the text. (SWF)

ACC# : L001284
AUTHOR: NA
AFFIL : Dewberry, Mealon and Davis, Engineers, Architects, Planners and Surveyors, Fairfax, Virginia
TITLE : Residential Wastewater Systems
SOURCE: National Association of Home Builders, 15th and M Streets, N.W., Washington, DC (110 pages)
YEAR : 1980
TEXT : This publication by the National Asscciation of Home Builders is intended to provide the home builder with design parameters and substantiating data required to select and design an individual wastewater treatment system. Representative design criteria are given for septic tank systems, modified soil absorption systems, mounds, evapotranspiration beds, and aerobic units and discharging systems. Diagrams showing system design and components are included. (AU/SWF)

ACC# : L001285
AUTHOR: NA
AFFIL : NA
TITLE : Presentation of Alternatives to Traditional Septic Systems for the Washington Metropolitan Area: Task II
SOURCE: Reference Document #5, Office of Community Development, Department of Community and Economic Development, Montgomery County, Maryland, (59 pages)
YEAR : 1977
TEXT : A wide range of individual and small community waste disposal systems can meet the needs of unsewered locations in the Washington, DC, metropolitan area. Alternative systems and the site conditions for which they are suited include mound systems, lined and unlined evapotranspiration beds, sand filters, alternating drainfields and the sewage osmosis process. The text also covers incineration, biological, and composting toilets, community sewers, alternative methods of site evaluation and management districts. (SWF)

ACC# : L001286
AUTHOR: Weireter-R
AFFIL : School of Forestry and Natural Resources at Humboldt State University, Arcata, California
TITLE : Waste Not Wastewater-West: The Arcata Experiment
SOURCE: American Forests, 88(6):38-53 (5 pages)
YEAR : 1982
TEXT : The Arcata Salmon Aquaculture Program is a demonstration of successful multiple-use management of wastewater. Three marshes and a lake exist on the 100 acres on which Arcata, California, operates a lagoon-based wastewater system, wildlife habitat, a marine aquaculture project, a research and breeding area for chinook salmon and a public recreation area. One acre of marshland, handling approximately one-tenth of the wastewater flow of the entire system, is being utilized in a pilot project studying the feasibility and efficiency of using marshes to provide tertiary treatment of the city's wastewater. (AU/SWF)

ACC# : L001287
AUTHOR: NA
AFFIL : NA
TITLE : Stop the Five Gallon Flush: A Survey of Alternative Waste Disposal Systems
SOURCE: Minimum Cost Housing Group, School of Architecture, McGill University, Montreal, Canada (47 pages)
YEAR : 1980
TEXT : This is a catalog of 80 wastewater disposal systems commercially available in North America and Europe. Focus is on low cost technologies for individual onsite systems. Product categories include pot latrines, pour-flush toilets, composting toilets, septic tanks, bucket, cartage and water borne systems. Provides manufacturers' names and addresses but no price. (SWF)

ACC# : L001288
AUTHOR: Hatlen, J.B.
AFFIL : Department of Environmental Health, University of Washington, Seattle, Washington
TITLE : Public Health Considerations for On-Site Sewage Disposal
SOURCE: Proceedings of Northwest On-Site Waste Water Short Course, December 8 & 9, 1976, University of Washington, p. 27-32 (6 pages)
YEAR : 1976
TEXT : Public health considerations are the major reasons for the detailed rules and regulations pertaining to on-site sewage disposal. Five areas of attention (legal issues, infectious disease transmission, chemical contamination, aesthetics and consumer protection) are discussed with regard to their effect on the development of onsite disposal regulations. (SWF)

ACC# : L001289
AUTHOR: Bitondo, M.
AFFIL : Hoover-NSK Bearing Plant, Ann Arbor, MI
TITLE : Cold Weather Waste Treatment
SOURCE: Industrial Wastes (1 page)
TEXT : In a program of bacterial supplementation, known as bio-augmentation, specially selected bacteria are added to a trickling filter system to remedy high effluent BOD levels during cold weather. More consistent and improved BOD levels in the plant effluent are claimed. (SWF)

ACC# : L001290
AUTHOR: Hansel, M.J.
AFFIL : Minnesota Pollution Control Agency, Roseville, Minnesota
TITLE : Two Onsite Options for Problem Soils
SOURCE: Individual Onsite Wastewater Systems - Proceedings of the Sixth National Conference, 1979, Ann Arbor Science Publishers, Ann Arbor, MI (24 pages)
YEAR : 1980
TEXT : Pumping stations and mounds are described as onsite sewage systems for marginal soil conditions. Pumps discussed are solid handling pumps and septic tank-effluent pumps (STEP). Design and construction information are provided for both pumps and mound systems. System diagrams are provided. (SWF)

ACC# : L001291
AUTHOR: Nelson, B.N.
AFFIL : Pueblo Regional Planning Commission
TITLE : Pueblo Area Council of Government's Pueblo County Septic Tank Maintenance Demonstration Project
SOURCE: Pueblo Regional Planning Commission (36 pages)
YEAR : 1981
TEXT : A 208 progress report describes work accomplished by the Pueblo County Septic Tank Maintenance Demonstration Project during 1974 and 1980. Operation plans and procedures, maintenance problems and difficulties encountered are outlined by a statistical analysis of accomplishments and findings. Tables present groundwater analyses. A breakdown of project costs for the two years is given. (SWF)

ACC# : L001292
AUTHOR: Fredrickson, D.W.
AFFIL : Bureau of Environmental Health, Division of Health, Dept. of Health and Social Services, Madison, Wisconsin
TITLE : Soil Mottling and Groundwater Monitoring
SOURCE: Individual Onsite Wastewater Systems - Proceedings of the Sixth National Conference, 1979, Ann Arbor Science Publishers, Ann Arbor, MI (11 pages)
YEAR : 1980
TEXT : Soil mottling indicates levels of soil saturation and can be used to

locate shallow groundwater or zones of soil saturation which prevent proper operation of soil absorption systems. The paper defines mottles (a type of variation in soil colors) and briefly describes the biochemical process of mottle formation. Considers reliability of mottling as an indicator of soil saturation in light of observed groundwater levels, and discusses its limitations with specific reference to Wisconsin's glacial soils. Summarizes the state's procedures for groundwater monitoring, and concludes that a better understanding of soil mottling may reduce the need for monitoring. (SWF)

ACC# : L001293
AUTHOR: Chesnin, L.
AFFIL : Waste Management Specialist Agronomy Department, University of Nebraska, Lincoln, Nebraska
TITLE : Aquaculture for Waste Management
SOURCE: BioCycle, 23(3):52-56 (5 pages)
YEAR : 1982
TEXT : Research concerning waste management and fish production is presented. Wastes are divided into three categories: animal, human and industrial. Use of nutrients to produce protein for domestic animals in the human food chain is stressed. Tables defining fish production from manure/algae systems are provided. (SWF)

ACC# : L001294
AUTHOR: Brown, R.M.
AFFIL : National Sanitation Foundation, Ann Arbor, Michigan
TITLE : Practice, Policy, Experience: Where are We?
SOURCE: Individual Onsite Wastewater Systems - Proceedings of the Sixth National Conference, 1979, Ann Arbor Science Publishers, Ann Arbor, Michigan
YEAR : 1980
TEXT : Three tables summarize results of surveys conducted by the National Sanitation Foundation for its National Conference on Individual on-site wastewater systems. Responses from 42 states include permitting authority, state rules, onsite alternatives, field sizing, conformity with NSF standards, use of recycling systems, and the effect of 1977 Clean Water Act amendments. Summarizes the relative value of onsite system technologies and onsite system utilization. Sample questionnaires included. (SWF)

ACC# : L001295
AUTHOR: NA
AFFIL : Southern Rockingham Regional Planning District Commission, 19 Main Street, Salem, New Hampshire
TITLE : The Conversion of Shorefront Seasonal Homes to Year-Round Homes in the Southern Rockingham Planning Region: Water Quality Impact and Recommendations
SOURCE: Southern Rockingham Regional Planning District Commission, 19 Main Street, Salem, New Hampshire 03079 (158 pages)
YEAR : 1975
TEXT : The quality of South Rockingham lakes is examined in relation to adjacent shoreland use and the migration of pollutants to surface waters. Evidence is presented which demonstrates the relationships between septic tank use and adjacent surface water quality, and data on the number of shorefront homes, both seasonal and year-round, are summarized. The impact of seasonal home conversion in terms of wastewater discharge is assessed, and the area's lakes and ponds are classified in terms of their trophic condition and then in terms of their potential for development. The laws and regulations affecting ponds and lakes in the planning area are summarized, and a glossary of the technical terms is provided. (AU/SWF)

ACC# : L001296
AUTHOR : NA
AFFIL : NA
TITLE : DoJoker System: Special English Issue
SOURCE: DoJoker System: Special English Issue, Sept. 1981, No. 58, (45 pages)
YEAR : 1981
TEXT : DoJoker, a special English issue of a Japanese monthly journal is the vehicle for lending technical respectability to the DoJoker Process - a wastewater system comprised of a filter tank fitted with a net to catch household solid wastes and sections of earthen pipe leading from the tank. The DoJoker process utilizing soil processes can be integrated with other wastewater treatment systems, for example, at the outlet of septic tanks. A patent with diagrams illustrates the process. (SWF)

ACC# : L001297
AUTHOR: Olaniya, M.S., Nawlakhe, W.G., Sharma, H.C., Saxena, K.L.

AFFIL : Engineering Research Institute, Nebru Marg, Nagpur-440 020 India
TITLE : Pollution Studies of Well Water in Sewage Farm at Jaipur
SOURCE: Indina Journal of Environmental Health, 20(4):398-412 (15 pages)
YEAR : 1978
TEXT : Characterizes physico-chemical and bacteriological components of well water used for domestic and irrigation purposes in India. The wells are located on sewage farms where raw and diluted sewage is used for irrigation. The relationship between the pollution of well water and the distance from irrigation is shown graphically. The well waters are unfit for drinking or other domestic purposes. (SWF)

ACC# : L001298
AUTHOR: Buchholz, G.M.
AFFIL : James M. Montgomery Consulting Engineers, Inc., Walnut Creek, California
TITLE : An Overview of Alternative Onsite Wastewater Technology
SOURCE: Individual Onsite Wastewater Systems - Proceedings of the Sixth National Conference, 1979, Ann Arbor Science Publishers, Ann Arbor, Michigan (12 pages)
YEAR : 1980
TEXT : Provides an overview of onsite treatment and disposal units, including related design criteria and operation and maintenance requirements. Systems and techniques include septic tanks, aerobic units, compost systems, sedimentation chlorination, filtration and greywater/blackwater segregation and treatment. Three tables summarize O&M requirements, suitable applications based on effluent requirements and capital and operating costs, and suitability of various onsite units based on local soils, hydrology rainfall and effluent limitation. (AU/SWF)

ACC# : L001299
AUTHOR: NA
AFFIL : NA
TITLE : Three Million Gallons of Water Saved Annually
SOURCE: Land and Water, May/June 1982, p. 26 (1 page)
YEAR : 1982
TEXT : A commercially available water recycling system in Great Falls, Virginia, serves a complex of 39 stores and two restaurants. Three million gallons of water are recycled annually for use in toilets and urinals by a process involving biological action, filtration, and zone disinfection. The proprietary Cycle-Let system is enclosed, installed indoors and operated and monitored electronically. Final effluent may be discharged for irrigation, soil absorption, evaporation or into streams. (SWF)

ACC# : L001300
AUTHOR: Golueke, C.G.
AFFIL : BioCycle
TITLE : When is Compost "Safe?"
SOURCE: BioCycle, Journal of Waste Recycling, 23(2):28-36 (6 pages)
YEAR : 1982
TEXT : Criteria are presented for assessing the destruction of pathogens during composting. Necessary factors are internal temperatures ranging from 50 to 65 C, adequate mixing and aeration, plus sufficient reaction time. Tabular information includes thermal death points of fungal plant pathogens and bacterial human pathogens, survival times of animal pathogens in the soil and on plants, bacterial pathogens of plants and survival time of plant viruses outside the plant. (SWF)

ACC# : L001301
AUTHOR: Rockefeller, A.A.
AFFIL : Clivus Multrum Inc., Cambridge, Massachusetts
TITLE : The Greenhouse as Leach Field
SOURCE: Individual Onsite Wastewater Systems - Proceedings of the Sixth National Conference, 1979, Ann Arbor Science Publishers, Ann Arbor, Michigan, (9 pages)
YEAR : 1979
TEXT : The president of Clivus Multrum Inc., describes their experimental greywater treatment system which employs leach beds within humus soils established in greenhouses. The system is designed to collect solar energy and produce crops while treating greywater. Toilet wastes are handled separately by composting. Briefly discusses design parameters, crop production, and treatment efficiency. Final effluent BOD-5 ranged from 3 to 50 mg/l and suspended solids from 5 to 44 mg/l. Effluent disposal is subject to local regulatory constraints. Use of this system is suggested for onsite treatment on land not suited for conventional seepage fields. Estimated unit cost is $5,000. (SWF)

ACC# : L001302
AUTHOR: Jones, R.C., DenBesten, G.F.

AFFIL : Williams & Works, Grand Rapids, Michigan
TITLE : Alternative Wastewater Collection Systems for Small Communities
SOURCE: Individual Onsite Wastewater Systems - Proceedings of the Sixth National Conference, 1979, Ann Arbor, Michigan (16 pages)
YEAR : 1980
TEXT : Alternative small-diameter collection systems can reduce wastewater treatment costs in rural areas and in locations with high water tables. Paper presents summaries of basic design and operation for vacuum sewers and pressure systems (including grinder pumps and septic tank effluent pumps), and reviews their O&M factors and costs. Summarizes experience with several existing projects, and analyzes feasibility and cost-effectiveness of alternative systems for the two planned projects. (SWF)

ACC# : L001303
AUTHOR: Segall, B.A., Ott, C.R.
AFFIL : University of Lowell, Massachusetts
TITLE : Septage and Wastewater Treatment in Activated Sludge Process
SOURCE: Journal Water Pollution Control Federation, 52(11):2655-2665 (11 pages)
YEAR : 1981
TEXT : A septage monitoring project was conducted at a large activated sludge plant to determine the quantities of septage that plants can feasibly handle. Treatment cost, process capacity and effluent quality are studied, and septage characteristics are described. Increased operating expenses associated with accepting septage are reflected primarily in solids handling and disposal costs. For constant septage-feed systems, oxygen demand can be estimated based on parameters used for high strength wastewater. Shock loading can place a severe demand on a plant's aeration capacity. Primary clarifiers handling septage should be designed conservatively. The critical elements are effluent quality, sludge removal and surface skimming. (AU/SWF)

ACC# : L001304
AUTHOR: Hassett, A.F., Starnes, J.C.
AFFIL : O'Brien & Gere Engineers, Inc., Dover, Delaware and County Sanitary Engineer, Queen Anne's County, Maryland
TITLE : Vacuum Wastewater Collection: The Alternative Selected in Queen Anne's County, Maryland
SOURCE: Journal of Water Pollution Control Federation, 53(1):59-65 (7 pages)
YEAR : 1981
TEXT : A vacuum sewer project is described for Queen Anne's County, Maryland, that represents the largest publicly funded vacuum wastewater collection system in North America. It includes 12 vacuum collection systems, each with an independently operating vacuum and pumping station. The system includes approximately 197,000 feet of vacuum sewer, 1,050 vacuum valves and will serve 1,800 residences and commercial establishments, which include restaurants, marinas, and seafood processing plants. Certain factors with Queen Anne's County indicated that vacuum systems would be more cost-effective than either gravity or pressure collection systems. The service area has a high groundwater table, unstable soils, and a significant proportion of cluster development; conditions which favor a vacuum wastewater collection system from both a cost and a performance viewpoint. (AU)

ACC# : L001305
AUTHOR: Fay, C.W.
AFFIL : University of Alaska, Fairbanks
TITLE : Waste Not Wastewater-East: The Wolfeboro Solution
SOURCE: American Forests, 88(6):42-50 (4 pages)
YEAR : 1982
TEXT : Wolfeboro, New Hampshire, utilizes forestland spray irrigation to achieve zero wastewater discharge into Lake Winnipesaubee. Each of five areas is sprayed once a week with the equivalent of two inches of rain. The smallest spray area covers 14.4 acres, the largest, 23.4. The five plots total 98.6 acres, with a matching amount of acreage as a buffer around the perimeter of the site. Spray irrigation takes place only from May 1 to November 1 to coincide with the growing season. Effluent is stored through the winter, then gradually released over the summer. In the winter, cross country skiers utilize the accessible open space. (AU/SWF)

ACC# : L001306
AUTHOR: Winneberger, J.H.T., Burgel, J.A.
AFFIL : Septic-Tank Systems, and Associates, On-Site Wastewater Systems, 1019 Hearst Avenue, Berkeley, California
TITLE : On-Site Wastewater Management Districts
SOURCE: On-Site Waste Management - Volume VI, Hancor, Inc., Findlay, Ohio (41 pages)
YEAR : 1977

TEXT : Traces the history and current (1977) status of onsite wastewater management districts (OSWMDs), which employ a central authority in some or all aspects of design, installation, maintenance, operation and monitoring of onsite systems. Advocates public management of septic systems as the best way to assure proper design and maintenance, thus reducing system failures. Experiences with a variety of OSWMDs in California are described, along with an experimental aerobic systems management plan in Kentucky, community soil absorption systems in Wisconsin, and state guidelines for OSWMDs in Washington. Special programs associated with field staff selection, training, and professional development are discussed. (SWF)

ACC# : L001307
AUTHOR: Wu, Y.C., Smith, E.D.
AFFIL : Dept. of Civil Engineering, University of Pittsburgh, PA and Construction Engineering Research Lab., Dept. of the Army, Champaign, IL
TITLE : Rotating Biological Contactor System Design
SOURCE: American Society of Civil Engineers, 345 East 47th Street, New York, NY (6 pages)
YEAR : 1982
TEXT : Practical application of Wu's model for the prediction of soluble BOD removal in RBC systems is discussed extensively for various operating conditions. The model was tested by the use of more than 80 data sets obtained from the operation of six full-scale RBC plants. Also, nomograms were constructed to demonstrate a method for selecting the design surface hydraulic loadings. More importantly, the hydraulic loading rates predicted/calculated on the basis of the criteria employed for four full-scale RBC plant designs were compared with the actual design hydrualic loadings. No significant difference between the predicted and the designed hydraulic loading was found. (AU)

ACC# : L001308
AUTHOR: Overman, A.R., Leseman, W.G.
AFFIL : Agricultural Engineering Dept., University of Florida, Gainesville, Florida
TITLE : Soil and Groundwater Changes Under Land Treatment of Wastewater
SOURCE: American Society of Civil Engineers, 345 East 47th Street, New York, NY (7 pages)
YEAR : 1982
TEXT : Municipal wastewater was applied to a sandy soil under crop management. Characteristics of the wastewater, soil and groundwater were measured. Results showed that the soil removed essentially all of the suspended solids, BOD, fecal bacteria and phosphorus. Soil pH stabilized at 6.0, while groundwater pH was intermediate between wastewater and background values. Calcium was the dominant exchangeable cation and passed through the soil unchanged. Potassium was removed by the crop. The soil provided effective buffer capacity for ion uptake. Appreciable dilution of nitrogen occurred in the groundwater. (AU)

ACC# : L001309
AUTHOR: Rich, L.G.
AFFIL : Department of Environmental Systems Engineering, Clemson, South Carolina
TITLE : Design Approach to Dual-Power Aerated Lagoons
SOURCE: American Society of Civil Engineers, 345 East 47th Street, New York, NY (14 pages)
YEAR : 1982
TEXT : Completely- and partially-suspended lagoon cells are defined and their use in dual-power level, multicellular systems is discussed. A procedure is presented for the design of such systems on a rational basis using biokinetic coefficient data. Factors relating to the performance of these systems with respect to soluble BOD-5 and suspended solids in the effluent are also discussed. Special attention is paid to cell size and number, power requirements both for solids suspension and oxygen demand, benthal solids decay, and sludge accumulation. A design example is given. It is concluded that further research and performance data derived from systems designed by the procedure are needed for a better evaluation of the parameters used and to test the assumptions made in applying the procedure. (AU)

ACC# : L001310
AUTHOR: Erickson, A.E., Bastian, J.W.
AFFIL : Department of Crop and Soil Sciences, Michigan State University, East Lansing, Michigan and Michigan Department of Transportation, Lansing, Michigan
TITLE : The Michigan Freeway Rest Area System - Experiences and Experiments with Onsite Sanitary Sytems
SOURCE: Individual Onsite Wastewater Systems - Proceedings of the Sixth

National Conference, 1979, Ann Arbor, Michigan (11 pages)
YEAR : 1980
TEXT : Describes Michigan experiences with onsite sanitary systems for highway rest areas. History, design, and efficiency of methods used for a variety of sites are discussed. Systems include septic tank-tile fields, lagoons, septic tank-leaching pits, and a recirculating oil system. Field studies are being constructed for several techniques, including septic tank-sand filter-overland flow, evapotranspiration (ET), lagoon-seepage beds, lagoon-overload flow-ET, and a lagoon-modified barriered landscape water renovation system which provides a high degree of effluent treatment. (SWF)

ACC# : L001311
AUTHOR: Makeig, K.S.
AFFIL : Dames & Moore, 7101 Wisconsin Ave., Ste. 700, Washington, DC
TITLE : Natural Buffers for Sludge Leachate Stabilization
SOURCE: Ground Water, 20(4):420-429 (10 pages)
YEAR : 1982
TEXT : A study is described to quantify the amount of buffer area around a trenching operation that would allow for the natural soils to stabilize sludge leachate without threatening the groundwater supplies of surrounding communities. The calculation of the necessary vertical buffer is based on the exchange of cations in the unsaturated soils below the trench. The calculation of a horizontal buffer is based on nitrate loadings and is a two-step process. The additional nitrate load on the soil/water systems resulting from sludge entrenchment is calculated, and this amount is used as an input for an advection-dispersion model which predicts the concentration distribution of nitrates on the groundwater at a given point in time. Horizontal buffer widths are generally greater than vertical buffer thicknesses. (AU/SWF)

ACC# : L001312
AUTHOR: Mills, J.G., Zwarich, M.A.
AFFIL : Department of Soil Science, University of Manitoba, Winnipeg, Manitoba
TITLE : Movement and Loss of Nitrate Following Heavy Applications of Sewage Sludge to a Poorly Drained Soil
SOURCE: Canadian Journal of Soil Science, 62(2):249-257 (9 pages)
YEAR : 1982
TEXT : Three fields which received a heavy application of digested sewage sludge were studied over a 6-year period to determine the accumulation, movement and losses of nitrate. The soils were fine-textured and predominantly poorly drained. After an initial fallow year, the fields were cropped to cereals. Very high nitrate concentrations were found near the soil surface for several years. Downward movement of nitrate was very slow. There was a continuous loss of nitrate over the study period; this was attributed to denitrification. Laboratory experiments using N were conducted to determine the rate of denitrification and the soil conditions that were favorable to the reaction. The denitrification intensity of the soil profile decreased with depth, but was still appreciable at the greatest depth. When oxygen diffusion in the soil was slow and oxygen demand was high, denitrification occurred within a few centimeters of the soil surface or an air-filled pore. Poorly drained soils promote denitrification and offer some protection against the risk of nitrate pollution of groundwater. (AU)

ACC# : L001313
AUTHOR: Clanton, C.J., Anderson, J.L., Machmeier, R.E., Hansel, M.J.
AFFIL : Department of Agricultural Engineering, Soil Science Department, University of Minnesota and Minnesota Pollution Control Agency
TITLE : Maximum Loading Rates for Septage to Soils - Progress Report
SOURCE: On-Site Sewage Treatment - Proceedings of the Third National Symposium on Individual and Small Community Sewage Treatment, 1981, American Society of Agricultural Engineers, St. Joseph, Michigan (10 pages)
YEAR : 1982
TEXT : Presents an evaluation of maximum loading rates of septage based on nitrate movement through three soil profiles. Results show that the application rates in this study are above the maximum rate that can be utilized by the three soils studied. In the first year, soil type, application rates or soil depth did not result in a significant difference in total Kjeldahl nitrogen, ammonia, fecal streptococcus and fecal coliform in the soil water samples. However, the nitrate concentrations were significantly different between the soils, application rates and soil depths. In the second year, with no additional septage application, there was a significant difference in nitrates and total Kjeldahl nitrogen between the soils, application rates and soil depth. (AU/SWF)

ACC# : L001314
AUTHOR: Mote, C.R., Pote, J.W., Rutledge, E.M., Scott, H.D., Mitchell, D.T.

AFFIL : Agricultural Engineering Dept., Agronomy Dept., Civil Engineering Dept., University of Arkansas, Fayetteville, Arkansas
TITLE : A Computerized Design and Simulation Model for Pressure Distribution Systems in Sloping Septic Tank Filter Fields
SOURCE: On-Site Sewage Treatment - Proceedings of the Third National Symposium on Individual and Small Community Sewage Treatment, 1981, American Society of Agricultural Engineers, St. Joseph, Michigan (13 pages)
YEAR : 1982
TEXT : Tests are conducted on individual orifices to observe the performance of pressurized-manifold distribution systems. A computer model is designed to determine the number and spacing of the orifices and calculate the lateral-by-lateral discharge rate and fill-up period duration for six different pressurized-manifold distribution systems. The tests show no detectable pattern of decreasing flow with increasing distance from the inlet. It is possible to design pressure distribution systems for sloping terrain so that flow per foot of lateral has minimal variation with elevation. Measurements show that although sloping pressurized-manifold systems distribute effluent evenly during steady-state operation, distribution is uneven during fill-up. (AU/SWF)

ACC# : L001315
AUTHOR: Stafford, D.A., Wheatley, B.I., Hughes, D.E.
AFFIL : University College, Cardiff, Wales
TITLE : Anaerobic Digestion
SOURCE: Proceedings of the First International Symposium on Anaerobic Digestion, held at University College, Cardiff, Wales, September 1979 (540 pages)
YEAR : 1979
TEXT : The proceedings from the First (1979) International Symposium on Anaerobic Digestion is presented in five parts. Part one is a description of the anaerobic digestion process. Part two provides the microbiological aspect of anaerobic digestion. Parts three and four discuss the control and feedstocks of anaerobic digestion, respectively. Part five is a worldwide survey of digester systems, together with newer types currently under development. (SWF)

ACC# : L001316
AUTHOR: Ward, G.D.
AFFIL : George D. Ward & Associates, Environmental Consulting Engineers, Portland, Oregon
TITLE : Onsite Treatment, Disinfection and Disposal of Septage
SOURCE: Individual Onsite Wastewater Systems - Proceedings of the Eighth National Conference, 1981, Ann Arbor Science Publishers, Inc., Ann Arbor, Michigan (13 pages)
YEAR : 1982
TEXT : Explores onsite lime stabilization of septage followed by onsite disposal. Mix requirements, lime addition and pathogen removal are defined. Application of this approach in an onsite wastewater management district was suggested as potentially viable following the development of lightweight mixing and monitoring equipment. (SWF)

ACC# : L001317
AUTHOR: Hill, W.F.
AFFIL : VSP Wastewater Technology, Engineering and Technical Services, Gettysburg, Pennsylvania
TITLE : Rehabilitation of Onsite Systems
SOURCE: Individual Onsite Wastewater Systems - Proceedings of the Eighth National Conference, 1981, Ann Arbor Science Publishers, Inc., Ann Arbor, Michigan (12 pages)
YEAR : 1982
TEXT : Discusses system onsite failure evaluation and rehabilitation using the proprietary POROX (hydrogen peroxide) treatment process and wastewater flow reduction measures. Outlines factors that should be considerecd in deciding whether the PCROX treatment process is the most appropriate solution. (SWF)

ACC# : L001318
AUTHOR: NA
AFFIL : NA
TITLE : Bacteria Solve Problems Created by Prisoners
SOURCE: Public Works, 1982 (1 page)
YEAR : 1982
TEXT : A high biological oxygen demand in a 52,500 gallon per day lagoon and a massive grease buildup in both lines and the lagoon were eliminated by the use of sodium nitrate and a bacterial agent. Sodium nitrate was used to reoxygenate the system, and DCB Plus from Flow Laboratories, a freeze-dried bacterial culture in a nutrient compound, was used to digest grease and solids. After restoring pond function without draining it, the bacterial supplement was added on a daily basis. The

preventative maintenance program was instituted to prevent future system failure due to toxic discharge or biological overloading. (SWF)

ACC# : L001319
AUTHOR: NA
AFFIL : NA
TITLE : Bibliography -- Reprint File
SOURCE: Biological Waste Management and Organic Resources Lab., Agricultural Environmental Quality Institute, U.S. Dept. of Agriculture, Beltsville, MD (18 pages)
YEAR : 1982
TEXT : Presents a bibliography of the Biological Waste Management and Organic Resources Laboratory, Agricultural Environmental Quality Institute, U.S. Dept. of Agriculture. Publications consider land treatment of wastewater and sludge from domestic and industrial sources. Presents the 201 facility plans in alphabetical order by author. (SWF)

ACC# : L001320
AUTHOR: Silverman, L.
AFFIL : American Clean Water Association, Wasington, DC
TITLE : Politics of Wastewater
SOURCE: Individual Onsite Wastewater Systems - Proceedings of the Eighth National Conference, 1981, Ann Arbor Science Publishers, Inc., Ann Arbor, Michigan (6 pages)
YEAR : 1982
TEXT : Political developments in wastewater can influence the profitability and success of small wastewater management systems. The politics of wastewater, as it affects onsite wastewater management and water conservation industries, is divided into six categories: 1) government procurement, 2) standard setting and code regulation, 3) grants and loan programs, 4) federal tax policy, 5) research, and 5) public education and training. (AU/SWF)

ACC# : L001321
AUTHOR: Cioloji, P.A.
AFFIL : Roy F. Weston, Inc., West Chester, Pennsylvania
TITLE : Issues and Steps Involved in Developing Management Programs
SOURCE: Individual Onsite Wastewater Systems - Proceedings of the Eighth National Conference, 1981, Ann Arbor Science Publishers, Inc., Ann Arbor, Michigan (10 pages)
YEAR : 1982
TEXT : Defines the issues that a community must address in developing an onsite wastewater management program. The analysis of technical and institutional issues provides the reader with what must be considered to establish a successful management program. (SWF)

ACC# : L001322
AUTHOR: NA
AFFIL : Triangle J. Council of Governments, P.O. Box 12276, Research Triangle Park, North Carolina
TITLE : Individual Non-Urban Wastewater Treatment and Management Alternatives
SOURCE: Triangle J. Council of Governments, P.O. Box 12276, Research Triangle Park, North Carolina (73 pages)
YEAR : 1978
TEXT : To serve as background information for an area-wide water quality management program, this report provides an overview and a detailed description of septic usage and problems in each county in the 208 Region. This report identifies past and present problems and proposes a more detailed analyses of selected problem areas. (AU/SWF)

ACC# : L001323
AUTHOR: Ward, R.C., Englehardt, J.D.
AFFIL : Dept. of Agricultural and Chemical Engineering, Colorado State University, Fort Collins, Colorado
TITLE : Maintenance: A New Role in Onsite System Management
SOURCE: Individual Onsite Wastewater Systems - Proceedings of the Eighth National Conference, 1981, Ann Arbor Science Publishers, Inc., Ann Arbor, Michigan (12 pages)
YEAR : 1982
TEXT : The authors propose a systems view of onsite wastewater treatment technology management, stressing the need to include operation and maintenance (O&M) functions in the formal management structure. They offer no exact way of adding O&M to the wastewater management program but suggest that current research efforts may help to define a proper technical viewpoint for O&M. (SWF)

ACC# : L001324

AUTHOR: Gouin, F.R.
AFFIL : Department of Horticulture, University of Maryland, College Park, Maryland
TITLE : Conifer Tree Seedling Response to Nursery Soil Amended with Composted Sewage Sludge
SOURCE : HortScience 12(4):341-342 (2 pages)
YEAR
TEXT : Describes germination and growth of Norway spruce and white pine sown in beds treated with three levels of screened and unscreened compost made from wood chips and dewatered digested sewage sludge. Seedlings of Norway spruce produced longer stems with screened composted sludge or fertilizer. More seedlings of white pine were produced by using unscreened composted sewage sludge. Soils amended with composted sewage sludge had higher pH, magnesium and phosphorus than those top-dressed with fertilizer and mulched with pine sawdust. (SWF)

ACC# : L001325
AUTHOR: Siegrist, R.L., Boyle, W.C.
AFFIL : Department of Civil and Environmental Engineering, University of Wisconsin-Madison
TITLE : Onsite Reclamation of Residential Greywater
SOURCE: On-Site Sewage Treatment - Proceedings of the Third National Symposium on Individual and Small Community Sewage Treatment 1981, American Society of Agricultural Engineers, St. Joseph, Michigan (11 pages)
YEAR : 1982
TEXT : Summarizes a field study of four household greywater septic tank/sand filter treatment systems. Defines greywater generation and characteristics along with the performance of two sand filter runs operated under two dosing schemes and different textured sand columnars operated under different loading rates. Results characterize greywater stability and the impact of high loading rates and high frequency dosing on performance and filter run times. (SWF)

ACC# : L001326
AUTHOR: Harper, M.D, Hirsch, M.S., Mote, C.R., Rutledge, E.M., Scott, H.D., Mitchell, D.T.
AFFIL : Agronomy Department, Engineering Department, Civil Engineering, University of Arkansas, Fayetteville, Arkansas
TITLE : Performance of Three Modified Septic Tank Filter Fields
SOURCE: On-Site Sewage Treatment - Proceedings of the Third National Symposium on Individual and Small Community Sewage Treatment 1981, American Society of Agricultural Engineers, St. Joseph, Michigan, p. 187-196 (10 pages)
YEAR : 1982
TEXT : Three modified standard filter fields with pressure distribution systems in soils with fragipans (impervious subsoil horizons) are observed under stressful operating conditions. The seepage beds are placed in the moderately permeable upper part of the subsoil, with fill placed above the system. (SWF)

ACC# : L001327
AUTHOR: Cliver, D.O.
AFFIL : Department of Bacteriology, Univerity of Wisconsin-Madison
TITLE : Wastewater: Emergent Environmental and Health Issues
SOURCE: Individual Onsite Wastewater Systems - Proceedings of the Eighth National Conference, 1981, Ann Arbor Science Publishers, Inc., Ann Arbor, Michigan (12 pages)
YEAR : 1982
TEXT : Emergent environmental and health issues in the area of onsite wastewater treatment and disposal are discussed. The issues include: the public's perceptions of wastewater and the need to reuse it; the conventional septic tank-soil field system, which has not been studied adequately; fate of viruses and other pathogens in onsite waste treatment; the protection of groundwater; regulation of onsite waste treatment, including evaluation of sites before construction, monitoring of systems after construction, development and application of innovative waste treatment techniques, and the associated problems of planning and controlled land use; and onsite waste handling systems products, such as septage and its proper disposal. (AU/SWF)

ACC# : L001328
AUTHOR: Hornick, S.B., et al
AFFIL : Agricultural Environment Quality Institute, Beltsville Agricultural Research Center-West, Beltsville, Maryland
TITLE : Use of Sewage Sludge Compost for Soil Improvement and Plant Growth
SOURCE: Agricultural Environmental Quality Institute, Beltsville Agricultural Research Center-West, Beltsville, Maryland (12 pages)
YEAR : 1979
YEAR : 1979

TEXT : This report discusses the properties and uses of sewage sludge compost for soil improvement and for plant growth including (1) establishment, maintenance, and production of turfgrass and sod, (2) use in vegetable gardens, (3) production of field crops and forage grasses, (4) use on nursery crops and ornamentals, and (5) reclamation and revegetation of disturbed lands. Recommendations are provided as to time, methods, and rates of compost application for different soils and management practices. (AU)

ACC# : L001329
AUTHOR: NA
AFFIL : NA
TITLE : Westmoreland: Organization of Water and Sewerage Department
SOURCE: Airvac: The Vacuum Sewerage System, Rochester, Indiana (4 pages)
TEXT : Gives the organization of personnel and equipment for the vacuum collection system at Westmoreland, Tennessee. Westmoreland has 400 AIRVAC valves in operation serving approximately 550 homes and 2 schools. Delegation of duties for the 3-man water and sewerage department in Westmoreland define the basic operational requirements for a vacuum sewer. Tables giving power consumption provide operating cost information. (AU/SWF)

ACC# : L001330
AUTHOR: Calichman, S.
AFFIL : Health Director, Town of Acton, Massachusetts
TITLE : Septage Management: One Town's Experience, Acton, Massachusetts
SOURCE: Individual Onsite Wastewater Systems - Proceedings of the Eighth National Conference, 1981, Ann Arbor, Michigan (9 pages)
YEAR : 1982
TEXT : The evolution of septage management for the town of Acton, Massachusetts, is discussed. Septage disposal in shallow lagoons replaced shallow pits in 1978, and a full-time site attendent was hired. A lagoon system drains into a sand filter bed when sludge builds up to a depth of 12-14 inches. The sludge is composted subsequent to air drying. Groundwater studies have shown lagoon and sand filter removal efficiencies of coliforms to be 99.99%; the percentage removal of many chemicals tested was 85% or better. Inorganic constituents are not considered a problem but volatiles analysis revealed high levels of organics which may require additional action in the future to address this problem. (AU/SWF)

ACC# : L001331
AUTHOR: Seitzinger, K.B.
AFFIL : Private Consultant, Citrus Heights, California
TITLE : Beyond I/A Technology: The Legal and Political Constraints
SOURCE: Individual Onsite Wastewater Systems - Proceedings of the Eighth National Conference, 1981, Ann Arbor, Ann Arbor Science Publishers, Inc., Michigan (10 pages)
YEAR : 1982
TEXT : Describes the legal and political issues related to implementation of I/A alternatives. Discusses the liability of public agencies according to the reasonableness of their actions and individual rights to use their property. Recent cases which address these issues are cited along with a warning to public agencies to be prepared to defend their position on limited application of I/A technologies. (SWF)

ACC# : L001332
AUTHOR: Moreau, E.M.
AFFIL : Wastewater and Plumbing Control Program, Dept. of Human Services, Division of Health Engineering, Augusta, Maine
TITLE : Subsurface Wastewater Disposal Systems - Remedies and Prevention of Failures
SOURCE: Individual Onsite Wastewater Systems - Proceedings of the Eighth National Conference, 1981, Ann Arbor Science Publishers, Inc., Ann Arbor, Michigan (18 pages)
YEAR : 1982
TEXT : Describes site evaluation procedures according to Maine's plumbing and subsurface disposal rules. A step-by-step procedure for evaluating the site and inhouse wastewater use provides the investigator with the means of defining the cause of system failure. Suggests corrective measures for the more common causes of onsite system failure. (SWF)

ACC# : L001333
AUTHOR: Jordan, E.J.
AFFIL : Waste Treatment Products Division, Thetford Corporation, Ann Arbor, Michigan
TITLE : Wastewater Recycling -- Cost-Effective Onsite Treatment
SOURCE: Individual Onsite Wastewater Systems - Proceedings of the Eighth

National Conference, 1981, Ann Arbor Science Publishers, Inc., Ann Arbor, Michigan (8 pages)
YEAR : 1982
TEXT : A shopping center's water recycling treatment system consists of biological treatment, ultrafiltration and water polishing. The system is considered both effective and economical by meeting the following requirements: 1) user and public health reliability, 2) economical operation and maintenance costs, and 3) system manageability. The system's performance is discussed in relation to these three requirements. (SWF)

ACC# : L001334
AUTHOR: Haith, D.A., Koenig, A., Loucks, D.P.
AFFIL : Cornell University, Ithaca, New York
TITLE : Preliminary Design of Wastewater Land Application Systems
SOURCE: Journal Water Pollution Control Federation, 49(12):2371-2379 (9 pages)
YEAR : 1977
TEXT : Presents a mathematical model for the detailed planning or preliminary design of land application systems. Mass balance equations describe the dynamics of nitrogen and water in storage facilities and in the soil to which the wastewater is applied. The cost-effectiveness model for a spray irrigation system cannot be solved for the least-cost design directly; it is readily adapted to a procedure for estimating the costs and performance of alternative preliminary designs. A sample problem using the design model evaluates 11 alternatives. (SWF)

ACC# : L001335
AUTHOR: Plews, G.
AFFIL : On-Site Waste Disposal, Washington State Department of Social and Health Services, Olympia, Washington
TITLE : Probable Benefits of Flow Reduction and/or Modification for Individual Wastewater Treatment Systems
SOURCE: Proceedings of Northwest On-Site Waste Water Disposal Short Course, December 8 & 9, 1976, University of Washington, p. 62-65 (14 pages)
YEAR : 1976
TEXT : The quantity and quality of wastewater from various in-house activities are measured and presented in tabular and graphical form. According to findings, the two greatest water uses in the home are for toilet flushing and clothes washing. Reducing wastewater volume can have a beneficial effect on liquid acceptance rates for standard systems used in marginal soils. An appendix lists wastewater flow reduction service available for the home. (AU/SWF)

ACC# : L001336
AUTHOR: Johnson, D., Ahluwalia, G.
AFFIL : Environmental Controls Committee, National Association of Home Builders
TITLE : National Association of Home Builders Sewer Moratoria Survey
SOURCE: National Association of Home Builders, 15th and M Street, N.W., Washington, DC (56 pages)
YEAR : 1979
TEXT : This report by the National Association of Home Builders describes the extent and nature of sewer moratoria (regulatory action temporarily limiting housing construction due to inadequate treatment or collection facilities) in the United States in 1979. The study, which solicited responses from local governments and building contactors, had three phases: identifying localities with sewer moratoria, listing causes and characteristics of moratoria, and assessing their impact on home building. Survey results are compared with a 1976 U.S. Dept. of Housing and Urban Development study. Responses show that many of the jurisdictions (27%) surveyed do not permit the use of alternative sewage disposal, collection and treatment systems. Alternative systems receiving the most favorable response from local jurisdiction and builders include multiple home septic tanks and package plants. A table summarizes the builder's and local jurisdiction's response to ten alternative systems. (SWF)

ACC# : L001337
AUTHOR: Grayson, S.C., Olive, D.F., Steinbeck, S.J.
AFFIL : Septage Study, Division of Health Services and Sanitation Branch, Division of Health Services, Raleigh, North Carolina
TITLE : The North Carolina Septage Study, July 1982
SOURCE: Solid and Hazardous Waste Branch of the North Carolina Division of Health Services, (200 pages)
YEAR : 1982
TEXT : Examines the generation, movement and disposal methods for septage in North Carolina. Investigators distributed questionnaires to wastewater treatment plant operators, local health departments and households, and then interviewed households within one county. Considers methods of collection, handling, and disposal in all counties of North Carolina.

(AU/SWF)

ACC# : L001338
AUTHOR: John, S.F.
AFFIL : Randolph & Associates, Inc., 1501 N. Water Street, Decatur, Illinois
TITLE : Wastewater Clusters, A Case Study of Waynesville, Illinois
SOURCE: Illinois Environmental Health Journal, 8(3):4-15 (7 pages)
YEAR : 1980
TEXT : Describes the planning and alternative selection for a small community wastewater system in Illinois in the Construction Grants Program. The planning, present worth analysis and preliminary design for a managed onsite and cluster system clearly state why this system is appropriate for small rural communities. Small-diameter sewers transport effluent to a community mound system and cluster seepage field. (SWF)

ACC# : L001339
AUTHOR: NA
AFFIL : NA
TITLE : Sewage Facilities Plan, Newburg, West Virginia
SOURCE: Environmental Energy Engineering, Inc., and Parrott, Ely & Hurt Consulting Engineers, Inc., 620 Euclid Ave., Lexington, Kentucky (168 pages)
YEAR : 1982
TEXT : A 201 sewage facilities plan for the development of adequate wastewater collection, treatment and disposal facilities within the Newburg Planning Area, West Virginia, provides for small-diameter effluent sewers to serve 132 users, onsite disposal systems to serve 42 users and 17 customers to utilize STEP pressure sewers. Septic tanks would be maintained by the town. Projected 1981 costs for the collection system, treatment system, onsite disposal systems, and annual operation and maintenance costs are tabulated. (AU/SWF)

ACC# : L001340
AUTHOR: Kreissl, J.F.
AFFIL : U.S. EPA, Wastewater Research Div., 26 W. St. Clair St., Cincinnati, Ohio
TITLE : On-Site Wastewater Disposal Research in the United States
SOURCE: Alternative Wastewater Treatment, D. Reidel Publishing Company, (27 pages)
YEAR : 1982
TEXT : During the past eight years (1974-1982), the U.S. EPA Small Flows Research Program has supported onsite wastewater disposal research in the United States. A discussion of current results obtained from field installation of alternative small flows systems includes pressure distribution/dosing systems, alternating bed systems, mound systems, artificially drained systems, shallow trench systems, evapotranspiration systems, evapotranspiration-adsorption systems, sand filters and blackwater/greywater systems. Nine figures illustrate these systems. (SWF)

ACC# : L001341
AUTHOR: US-EPA
AFFIL : EPA-Office of Water Program Operations
TITLE : Residential Water Conservation - An Annotated Bibliography
SOURCE: FRD-16, General Services Administration (8 BRC), Centralized Mailing List Service, Bldg. 41, Denver Federal Center, Denver, CO 80225 (120 pages)
YEAR : 1980
TEXT : A bibliography of literature pertinent to residential water conservation is presented in this EPA publication authored by the United States Department of Housing and Urban Development. It is a comprehensive listing of publications on water conservation tips, devices and projects, the economics of water-saving, and regional variables affecting water conservation practices. Other useful information is summarized from the references and included on community water conservation projects, cost and energy/water savings and residential water use. Communities planning water conservation programs may find this bibliography especially useful. (AU/SWF)

ACC# : L001342
AUTHOR: Lenning, D.A.
AFFIL : Wastewater Management Specialist, Dept. of Social and Health Services, Olympia, Washington
TITLE : Management Programs for On-Site Wastewater Disposal
SOURCE: Proceedings of 2nd Northwest On-Site Wastewater Disposal Short Course, University of Washington, March 1 & 2, 1978 (13 pages)
YEAR : 1978
TEXT : Describes three different management schemes for onsite systems.

Discusses functions, powers, eligibility and problems of the management entity. Outlines the current Washington State program in detail; this program is primarily concerned with the operation and maintenance aspects. (SWF)

ACC# : L001343
AUTHOR: Lustig, K.W.
AFFIL : Panhandle Health District 1, Idaho
TITLE : Effects of Wastewater on Groundwater: An Idaho Experience
SOURCE: Proceedings of 2nd Northwest On-Site Wastewater Disposal Short Course, University of Washington, March 1 & 2, 1978 (7 pages)
YEAR : 1978
TEXT : Describes a well monitoring program of the Rathrum Aquifer in Idaho along with the aquifer's flow and general pattern. Nitrate levels significantly increased over the last six years since the area experienced intense housing development which exclusively utilized individual subsurface sewage disposal methods. (SWF)

ACC# : L001344
AUTHOR: Otis, R.J.
AFFIL : Dept. of Civil and Environmental Engineering, University of Wisconsin, Madison, Wisconsin
TITLE : Aerobic Household Wastewater Treatment Units
SOURCE: Proceeding of 2nd Northwest On-Site Wastewater Disposal Short Course, University of Washington, March 1 & 2, 1978 (17 pages)
YEAR : 1978
TEXT : Compares and contrasts biological processes, effluent quality and variability, operating and maintenance costs and total annual costs associated with conventional suspended growth and attached growth systems, small aerobic household wastewater treatment wastes and septic tank absorption field systems. Stresses the use of intermittent and recirculating sand filters as a process that increases performance of systems with highly variable effluents. Concludes that when operating properly, the effluent quality from all the systems can be characterized by low organic and suspended matter. However, except for intermittent or recirculating sand filters, their performance is highly variable due to periodic upsets of both a mechanical and biological nature. (AU/SWF)

ACC# : L001345
AUTHOR: US-EPA
AFFIL : EPA Water Planning Division (WH-554), 401 M Street, S.W., Washington, DC
TITLE : 208 Data Clearinghouse
SOURCE: 208 Data Clearinghouse, June 1979, Vol. 4, EPA Water Planning Division (WH-554), 401 M Street, S.W., Washington, DC 20460 (12 pages)
YEAR : 1979
TEXT : A 208 Data Clearinghouse bibliography includes some small flows-related citations under the categories of wasteload allocations, water quality goals and miscellaneous technical reports. It includes an alphabetical index of state and areawide agencies and their telephone numbers. (AU/SWF)

ACC# : L001346
AUTHOR: Coulter, R.G.
AFFIL : CMS Rotordisk, Inc.
TITLE : Off Sewer A.W.W.T.-RBC Based Systems
SOURCE: Southern Graphics LTS, #102 - 11471 Blacksmith Place, Richmond, B.C. VTE 4W9 (2 pages)
YEAR : 1982
TEXT : Compares the rotating biological contactor (RBC) package plant and the extended aeration package plant in terms of process stability, mechanical simplicity and reliability. (SWF)

ACC# : L001347
AUTHOR: Bennett, E.R., Linstedt, K.D.
AFFIL : Dept. of Civil, Environmental and Architectural Engineering, University of Colorado, Boulder
TITLE : ET Systems for Individual Home Wastewater Disposal
SOURCE: Proceedings of 2nd Northwest On-site Wastewater Disposal Short Course, University of Washington, March 1 & 2, 1978 (34 pages)
YEAR : 1978
TEXT : An EPA-sponsored study of evapotranspiration beds examines variations in loading rate, surface cover water depth and other design parameters under ambient weather conditions occurring in Boulder, Colorado. Includes a sieve analysis of the sand and the results of the capillary rise test. Provides a graphic description of results. Loading criteria should be based on evaporation rate minus precipitation during January

through May. The use of vegatative cover on a bed does not produce significant increases in allowable loading rate for non-discharging beds for permanent homes. The selection of sand used on a bed is very important. Provides design methods and cost analyses. (AU/SWF)

ACC# : L001348
AUTHOR: Water Supply/Conservation Program Staff
AFFIL : New England River Basins Commission, Boston, Massachusetts
TITLE : Before the Well Runs Dry: A Handbook for Designing a Local Water Conservation Plan
SOURCE: Proceedings of the National Water Conservation Conference on Publicly Supplied Potable Water, April 14-15, 1981, Denver, CO (13 pages)
YEAR : 1982
TEXT: Summarizes for design a local water conservation plan in a seven-step procedure. The procedure deals primarily with water supply problems; however, with certain modifications it can be applied to other problems as well. The seven steps include the following: 1) Identify problem/establish conservation goal; 2) Assess potential of supply management; 3) Analyze cost-effectiveness and impacts of management programs; 4) Identify actions to minimize adverse impacts; 5) Choose management programs/design the specifics of each management program; 6) Evaluate and select hardware/software; and 7) Summarize conservation plans.

ACC# : L001349
AUTHOR: Martin, G.L., Schurr, K.
AFFIL : Div. of Surveillance and Water Quality Standards, Office of Wastewater Pollution Control, Ohio EPA, Columbus, Ohio, and Dept. of Biological Sciences, Bowling Green State University, Bowling Green, Ohio
TITLE : The Effect of the Greenwich Sewage Lagoon Discharge Upon Two Small Receiving Streams in Northwest Ohio
SOURCE: Bowling Green Popular Press, Science Series, Bowling Green, Ohio (112 pages)
YEAR : 1979
TEXT: A coordinated Ohio EPA and Bowling Green State University study determined the effect of sewage lagoon discharge upon the Southwest Branch of the Vermilion River and a small intermittent stream receiving the wastewater by observing benthic macroinvertebrate and fish population changes along with chemical-physical measurements. The intermittent stream generally was within limits established by Ohio's water quality standards. The lagoon discharge lowered dissolved oxygen and increased nitrogen, phosphorus and chloride concentrations in the Southwest Branch; however, water quality standards were maintained. (AU/SWF)

ACC# : L001350
AUTHOR: Hershaft, A
AFFIL : Enviro Control, Inc., Rockville, Maryland
TITLE : Wastewater Flow Reduction in the Home
SOURCE: Journal of Environmental Systems, 4(3):217-239 (23 pages)
YEAR : 1974
TEXT: An overview of water usage in the United States presents tabulated information on operation, water savings, homeowner acceptance, installed cost and the manufacturers of eight flow reduction devices and nine toilet types. Suggests an integrated household recycling system to deal with solid waste, energy and wastewater, as well as flow reduction ideas that could be used when cooking, bathing or toilet flushing. Finally, monetary costs, benefits and environmental, social and institutional considerations associated with flow reduction devices are presented. (AU/SWF)

ACC# : L001351
AUTHOR: Plews, G.D.
AFFIL : Dept. of Social and Health Services, Olympia, Washington
TITLE : Sizing of Standard Drainfields
SOURCE: Proceedings of 2nd Northwest On-site Wastewater Disposal Short Course, University of Washington, March 1 & 2, 1978 (7 pages)
YEAR : 1979
TEXT: Various methods analyzed for sizing soil absorption fields include the percolation test, the crust test and the flow net analysis. Tables include drainfield sizing methods utilized by various states, a comparison of loading rates suggested by investigators, and U.S. Public Health Service absorption-area requirements for individual residences. The author notes that the best method for sizing drainfields should be simple, reproductible, objective and inexpensive to perform, and it should provide a rational basis for most designs. Concludes that except for heavy clay-type soils and very coarse sands, loading rates of between 0.4 and 0.7 gallons per square foot have been shown to be

acceptable. (AU/SWF)

ACC# : L001352
AUTHOR: Winneberger, J.T.
AFFIL : Office of Appropriate Technology, 1530 10th Street, Sacramento, California
TITLE : Suitability of On-site Wastewater Disposal Systems Along California's Coast
SOURCE: Office of Appropriate Technology, 1530 10th Street, Sacramento, California (24 pages)
YEAR : 1976
TEXT: The author expresses management, engineering, legislative, and educational opinions related to onsite systems in California's coastal areas. He addresses the problems associated with separating authority and responsibility at the local-regional interface, presents a table illustrating variations in onsite regulations and practices in five California counties, discusses professional resistance to innovative/alternative design, and suggests a need for more formal education in onsite systems. (AU/SWF)

ACC# : L001353
AUTHOR: Theiler, D.F., Schuff, R.G., Witt, M.D., McCutcheon, G.L., Quigley, J.T., Wade, R.E.
AFFIL : The Sigurd Olson Environmental Institute, Northland College, Ashland, WI
TITLE : Wastewater Treatment & Disposal for Small Communities: A Training Program
SOURCE: The Sigurd Olson Environmental Institute, Northland College, Ashland, WI (452 pages)
YEAR : 1981
TEXT : This training manual is designed for federal, state, and local personnel charged with the responsibility of planning and reviewing facilities plans for small communities. Sections include: facility planning, public participation, use of soils, on-site system design, septage management and disposal, land disposal, alternative collection systems, conventional treatment systems, and institutional and management technologies. (SWF)

ACC# : L001354
AUTHOR: Stone, R., Kahle, R., Rowlands, J.
AFFIL : Ralph Stone and Company, Inc., 10954 Santa Monica Boulevard, Los Angeles, California
TITLE : Alternative Wastewater Treatment Approaches for Small Communities Volume, I and II
SOURCE: Ralph Stone and Company, Inc., 10954 Santa Monica Boulevard, Los Angeles, California (304 pages)
YEAR : 1982
TEXT : Alternative wastewater treatment systems (both on- and off-site were evaluated at 43 sites for cost-effectiveness, energy requirements, environmental impacts, social impacts and effects on flora and fauna. The sites studied were examples and do not represent a scientific sample. Technical, institutional and policy incentives and barriers to alternative systems are described. Alternative technologies studied include: improving existing septic tank systems; surface and subsurface soil treatment; intermittent sand filters, submerged rock filters, total containment (a lagoon system for areas with high evaporation-percolation rates; inpond particulate removal (including aquaculture); improved O&M at existing treatment plants; special toilets; onsite wastewater management districts; pressure sewers; and vacuum sewers. Separate appendix defines objectives, scope and methods; state and local alternative programs for small communities; and survey background data. (SWF)

ACC# : L001355
AUTHOR: Fenn, D.B.
AFFIL : U.S. Geological Survey, National Center, Reston, Virginia
TITLE : Soil Water: Chapter 6
SOURCE: National Handbook of Recommended Methods for Water - Data Acquisition, Office of Water Data Coordination, U.S. Geological Survey, MS-417 National Center, Reston, VA (9 pages)
YEAR : 1982
TEXT : Identifies recommended methods by the U.S. Geological Survey for measuring soil water and lists sources that describe these methods in detail. The recommended methods for characterizing soil water apply to the upper one to two meters of the soil. Covers the following soil water areas: content, potential, retention, movement and quality control. (AU/SWF)

ACC# : L001356
AUTHOR: U.S. EPA
AFFIL : U.S. EPA
TITLE : The Alternative is Conservation
SOURCE: FRD-12, General Services Administration (9FFS), Centralized Mailing Lists Services, Building 41, Denver Federal Center, Denver, Colorado (39 pages)
YEAR : 1980
TEXT : This text is a companion guide to "The Alternative is Conservation," a 20-minute color production, available in either 3/4 inch videocassette or in 16 mm film. Water conservation and management strategies can help to solve a community's water problems. Conservation is an alternative to the traditional expansion of supply and treatment for meeeting water needs. Five major ways to protect the water resource include: 1) land use controls, 2) keeping wastes from the waste system, 3) solid waste disposal controls, 4) hazardous chemical use and disposal controls, and 5) minimizing water consumption waste. The guide describes how to choose a strategy that solves a community's water problems, innovative and alternative wastewater treatment options and funding available under the Clean Water Act of 1977, household devices to conserve water, and resouces for further information. (AU/SWF)

ACC# : L001357
AUTHOR: Oshkoohi, N.
AFFIL : Dept. of Civil Engineering, West Virginia University, Morgantown, WV
TITLE : Use of Bottom Ash as Media for the Construction of a Septic Tank Effluent Disposal System
SOURCE: Dept. of Civil Engineering, West Virginia University, Morgantown, WV (42 pages)
YEAR : 1979
TEXT : West Virginia University Department of Civil Engineering M.S. problem report describes field and laboratory studies of bottom ash as the filter bed media in a mound system. Bottom ash remains stable with intermittent and continuous loadings of sewage. There is no ponding problem. The bed is capable of filtering out both BOD-5 and suspended solids. A mound system with bottom ash filter media can provide a solution to the disposal of septic tank effluents in areas with high water tables and frequent flooding. The cost of the bottom ash filter media is markedly more favorable than the use of gravel. (AU/SWF)

ACC# : L001358
AUTHOR: Prince, R.N., Davis, M.E., Seitzinger, K.B.
AFFIL : Georgetown Divide Public Utility District, Georgetown, California, and Transamerica Development Company, Cool, California
TITLE : Design and Installation Supervision by an Onsite Management District
SOURCE: Individual Onsite Wastewater Systems - Proceedings of the Sixth National Conference, 1979, Ann Arbor Science Publishers, Inc., Ann Arbor, MI (9 pages)
YEAR : 1980
TEXT : Discusses three phases in an eight-year-old management program for onsite wastewater treatment in a California subdivision. Procedures employed include site evaluation, system design, and construction inspection. Site evaluation considers topography, physical features and soil properties. Design features are based on this evaluation and expected system needs. Construction inspection is intended to insure installation of the system as designed. (SWF) (SWF)

ACC# : L001359
AUTHOR: Wert, F.S., Henderson, U.B.
AFFIL : Department of Economics at Central State University, Edmund, OK
TITLE : Feed Fish Effluent and Reel in Savings
SOURCE: Water & Wastes Engineering, 15(6):38-44 (4 pages)
YEAR : 1978
TEXT : An EPA supported study compared the costs and technical effectiveness of various conventional wastewater treatment strategies with those of aquaculture methods. The systems were designed for municipalities in the South West United States having approximately 2,000 inhabitants and an influent flow of 200,000 gpd. The strategies included various combinations of conventional systems, aquaculture raceways and aquaculture fish lagoons. The results showed that aquaculture systems could achieve substantial cost savings over conventional systems, especially in the area of nutrient removal. The stabilization lagoon with an aquaculture system was the most cost-effective treatment method with regard to meeting acceptable effluent BOD, SS and phosphorus concentration limits. System costs were only 28 percent of the costs of achieving that level of water quality by the most cost-effective conventional system. (AU/SWF)

ACC# : L001360
AUTHOR: Harris, S.E., Reynolds, J.H., Hill, D.W., Filip, D.S., Middlebrooks, E.J.
AFFIL : Utah State University, Logan, Utah
TITLE : Intermittent Sand Filtration for Upgrading Waste Stabilization Pond Effluents
SOURCE: Journal of Water Pollution Control Federation, p. 83-102 (20 pages)
YEAR : 1977
TEXT : From research conducted on pilot scale intermittent sand filters by Utah State University, it appears that lagoon effluents may be economically polished to satisfy the requirements of Pl 92-500. The following conclusions are based on data presented in the paper: 1) length of filter run is related to the influent suspended solids concentration and the hydraulic loading rate; 2) length of filter run is also related to algal growth in the standing water above the filter; 3) intermittent sand filters can produce an effluent with BOD and suspended solids concentrations of less than 10 mg/l, and a volatile suspended solids concentrations of less than 5 mg/l, 4) winter operation of the filters did not create any serious operational problems; however, winter effluent quality was slightly lower than warm weather effluent quality; and 5) hydraulic loading rates of 3,700 to 5,600 cubic meters/ha-d (0.4 to 0.6 mgad) appear to be optimum for the single stage intermittent sand filter. (AU)

ACC# : L001361
AUTHOR: Wiswall, K.C., Cictoli, P.A.
AFFIL : Weston Environmental Consultants, West Chester, Pennsylvania
TITLE : Management of Alternative Systems: Issues, Problems, Constraints and Opportunities
SOURCE: Individual Onsite Wastewater Systems - Proceedings of the Sixth National Conference, 1979, Ann Arbor Science Publishers, Inc., Ann Arbor, MI, (15 pages)
YEAR : 1980
TEXT : Different approaches to developing management programs for onsite and small community wastewater systems are illustrated. Based on a study in progress sponsored by U.S. EPA, experiences in nine communities are described. Six of the case studies involve management of individual systems, including septic tank-drainfield systems, as well as alternative onsite systems. The other three are examples of community systems involving low pressure sewers and clustered treatment. (AU/SWF)

ACC# : L001362
AUTHOR: Laak, R.
AFFIL : Department of Civil Engineering, University of Connecticut, Storrs, Connecticut
TITLE : Integrating Onsite System Design into Sanitary and Environmental Curricula
SOURCE: Individual Onsite Waste Water Systems - Proceedings of the Eighth National Conference, 1981, Ann Arbor Science Publishers, Inc., Ann Arbor, Michigan (4 pages)
YEAR : 1982
TEXT : Decribes how a course in Small Flows Technology, "Wastewater Engineering for Unsewered Areas," was integrated into the Civil Engineering curriculum at the University of Connecticut. The subject matter was developed from a wide variety of sources and from different scientific fields. Because the material was too voluminous to include in other graduate courses, it was developed as a separate course. (AU/SWF)

ACC# : L001363
AUTHOR: Barber, M.E., Gray, D.D.
AFFIL : Hydraulics and Systems Engineering Area, School of Engineering, Purdue University, West Lafayette, Indiana
TITLE : Hydraulics and Systems Engineering: Computer Aided Design of Pressure Sanitary Sewerage Systems
SOURCE: Report No. CE-HSE-82-3, Hydraulics and Systems Engineering Area, School of Engineering, Purdue University, West Lafayette, IN 47907 (88 pages)
YEAR : 1982
TEXT : This report presents a Fortran computer program (PSDP) for the design of pressure sanitary sewerage systems according to the design criteria and procedures recommended by Environment/One Corporation; Hydromatic Pumps Division of Wylain, Inc.; or SIECO, Inc. The user specifies the layout of a non-looping sewer network and the program selects the pipe sizes needed to meet the design criteria and assure efficient operation. This report explains the algorithms and describes the input procedures used in PSDP. Design examples are presented and a complete listing of the program is provided. Suggestions for further development are offered. (AU)

ACC# : L001364

AUTHOR: Pope, P., Colt, J., Ludwig, H.
AFFIL : University of California, Davis, California
TITLE : The Use and Potential of Aquatic Species for Wastewater Treatment: The Environmental Requirements of Crustaceans, Appendix C
SOURCE: California State Water Resources Control Board, Sacramento, California (175 pages)
YEAR : 1981
TEXT : Summarizes selected references dealing with the environmental requirements of potential crustacean species to be used for the treatment of wastewater. The overall bibliography is organized with six major sections dealing with 1) general introductory material on each species, 2) effects of physical parameters, 3) effects of chemical parameters, 4) effects of metabolic wastes, 5) effects of biological parameters, and 6) yield and chemical composition data. A section on standard references that are applicable to a number of individual subject areas is included. Author, species, and subject indexes are provided. (AU/SWF)

ACC# : L001365
AUTHOR: Reeher, L.
AFFIL : NA
TITLE : Legal Battle Over Septage Disposal
SOURCE: BioCycle, 23(4):34-35 (2 pages)
YEAR : 1982
TEXT : Because of difficulties in gaining public acceptance, the Pennsylvania Liquid Waste Haulers Association (PLWHA) have united to bring about positive legislation and greater public responsibility in septage utilization such as land application. Three goals are: 1) total cooperation between agricultural and environmental enforcement groups and the haulers; 2) programs to educate the public to the practice of agricultural application of sludge; 3) having the USDA become involved in eliminating the illegal dumping of sludge; and 4) including a number of liquid waste operators in governmental advisory committees. (SWF)

ACC# : L001366
AUTHOR: Teske-MG
AFFIL : Office of Environmental Health, Illinois Dept. of Public Health, Marion, Illinois
TITLE : Enhanced Treatment for Surface Discharge
SOURCE: Individual Onsite Wastewater Systems - Proceedings of the Sixth National Conference, 1978, Ann Arbor Science Publishers, Inc., Ann Arbor, MI, (5 pages)
YEAR : 1979
TEXT:
TEXT : Briefly describes the following individual onsite wastewater systems with surface discharges: waste stabilization ponds, buried sand filters, aerobic waste treatment systems, and intermittent sand filters. The recirculating sand filter is described in more detail. (SWF)

ACC# : L001367
AUTHOR: Jones, E.E.
AFFIL : Science and Education Administration Federal Research, Beltsville Agricultural Research Center, Beltsville, Maryland
TITLE : Septic Tank - Configuration Versus Performance
SOURCE: Proceedings of 2nd Northwest On-site Wastewater Disposal Short Course, University of Washington, March 1 & 2, 1978 (17 pages)
YEAR : 1978
TEXT : A discussion of the details in the design of a septic tank addresses volume and solids accumulation, surface area, compartmentation, outlet design, outlet depth, hydraulic loading and pumps and controls for dosing systems. (SWF)

ACC# : L001368
AUTHOR: Barth, E.F.
AFFIL : Kamber Engineering, Inc., Gaithersburg, Maryland
TITLE : Sequencing Batch Reactors: Doing More With less
SOURCE: Federal Water Quality Association Newsletter, Washington, DC (12 pages)
YEAR : 1982
TEXT : Advantages of batch reactors and typical design locations for the single and multiple tank arrangements are presented. References sequencing batch reactor research conducted at Notre Dame on nitrification/denitrification. Results of the first full-scale, 0.4 MGD sequencing batch reactor plant at Culver, Indiana, have consistently shown BOD and suspended solids in the plant to be consistently below 10 mg/l. A reduction of 89 percent in inorganic nitrogen has been observed. (AU/SWF)

ACC# : L001369

AUTHOR: Rich, L.G.
AFFIL : Water Resources Research Institute, Clemson University, Clemson, South Carolina
TITLE : Solids Control in Effluents from Aerated Lagoon Systems
SOURCE: Completion Report, OWRT Project No. B-105-SC, Water Resources Research Institute, Clemson University, Clemson, South Carolina (113 pages)
YEAR : 1978
TEXT : Describes (1) a field investigation of the performance of existing aerated lagoon systems, (2) a laboratory investigation of the settling characteristics of bacterial biomas solids in suspensions with concentrations similar to those encountered in aerated lagoon effluents, and (3) an engineering study to develop criteria for the design of aerated lagoon systems capable of improved performance with respect to effluent suspended solids. (AU/SWF)

ACC# : L001370
AUTHOR: Government Finance Research Center
AFFIL : Government Finance Research Center, Peat, Marwick, Mitchell & Co., Washington, DC
TITLE : Financial Capability Guidebook
SOURCE: Government Finance Research Center, Peat, Marwick, Mitchell & Co., Washington, DC, 1982 (73 pages)
YEAR : 1982
TEXT : The Financial Capacity Guidebook is designed to assist a community in effectively allocating public funds in the construction of wastewater facilites. It can assist communities with populations of 10,000 or less that 1) provide service only with a single jurisdiction or sanitary district, and b) represent an independent service area within a regional system. Worksheet topics include a delineation of local government roles and responsibilities making a costs estimate, analyzing operation and maintenance, financing the facilities, determining annual costs per households, assessing the community's debt history, and evaluating the community's financial situation. (AU/SWF)

ACC# : L001371
AUTHOR: Kloser, P.C., Schmidt, H.E.
AFFIL : General Development Utilities, Inc., Miami, Florida
TITLE : The Operation and Maintenance of the Suburbanaer (STEP) System
SOURCE: Individual Onsite Wastewater Systems - Proceedings of the Sixth National Conference, 1978, Ann Arbor Science Publishers, Inc., Ann Arbor, Michigan, (7 pages)
YEAR : 1979
TEXT : Discusses the advantages and maintenance details of the Suburbanaer System, a septic tank effluent pressure (STEP) system incorporating an interceptor tank. Hardware problems caused system failures when the system was first put into operation. These problems were remedied by use of polyvinylchloride (PVC) threaded fittings, bronze valves, PVC hose inserts, radiator hose and 300 series stainless steel clamps in the pump chamber. Safety features include a buzzer/light alarm activated by pump burnout or power failure. Infiltration into the system is virtually eliminated, with the pressure system considerably reducing plant construction operation and maintenance costs. Further advantages of the system, particularly of the interceptor tank are stressed. (AU/SWF)

ACC# : L001372
AUTHOR: Twichell, J.E.
AFFIL : Dept. of Landscape Architecture and Regional Planning, University of Massachusetts, Amherst, Massachusetts
TITLE : The Effects of the Use and Regulation of Septic Tank Systems Upon Land Use in Massachusetts
SOURCE: Completion Report, Project No. A-103, Water Resources Research Center, University of Massachusetts, Amherst, Massachusetts (97 pages)
YEAR : 1978
TEXT : Describes some of the effects of the widespread use and regulation of the septic tank systems on land use planning. A literature review reveals many consequences of using and regulating the septic tank system that have not yet been adequately documented. The results of interviews provide an understanding of the effects associated with the use of onsite systems regulations as a land use planning control. (SWF)

ACC# : L001373
AUTHOR: Lomax, K.M., Lane, L.S.
AFFIL : Horn Point Environmental Laboratories, Center for Environmental and Estuarine Studies, University of Maryland, Cambridge, Maryland
TITLE : Evapotranspiration - The Cheasapeake Bay Study
SOURCE: Individual Onsite Wastewater Systems - Proceedings of the Sixth National Conference, 1978, Ann Arbor Science Publishers, Inc., Ann Arbor, Michigan (9 pages)

YEAR : 1979
TEXT : The movement of water into the air by a grass-covered evapotranspiration (ET) bed was determined to be an effective means of wastewater disposal in the Cheasapeake Bay area. Problems associated with operation and maintenance of ET systems, design considerations, and bed construction were stressed. Recommended sizing of an ET bed for this geographic area is 3.5 mm/day of water (0.08 gpd/f_y2) for a grass-covered bed. A lined bed for complete evapotranspiration provides for more healthy grass throughout the year, but demands maximum and minimum flow rates of water. Proper bed construction requires a firm foundation and a level bottom. The transpiration ecosystem, so essential to year-round wastewater disposal, requires homeowner understanding of the system. (SWF)

ACC# : L001374
AUTHOR: Van Kirk, J.L., Grottkau, W.A., Howell, R.B., Shirley, E.C.
AFFIL : Office of Transportation Laboratory, California Dept. of Transportation, Sacramento, California
TITLE : Percolation Testing for Septic Tank Leach Fields at Roadside Rests
SOURCE: California Department of Transportation, Sacramento, California (74 pages)
YEAR : 1981
TEXT : In order to better design septic tank leachfield systems, a University of California project characterizes soil percolation rates at roadside rest areas. Inherent and associated problems with percolation tests are outlined, and a revised percolation test is devised. The effects of the hole depth, hole diameter, use of power auger in hole digging, use of pea gravel and perforated pipe, presoaking the hole, and measuring devices on percolation tests are outlined with accompanying graphs and tables. An illustrated step-by-step standardized percolation test procedure is outlined; sample percolation test calculations are included. (AU/SWF)

ACC# : L001375
AUTHOR: Kemp, M.C., Filip, D.S., George, D.B.
AFFIL : Utah Water Research Laboratory, College of Engineering, Utah State University, Logan, Utah
TITLE : Evaluation and Comparison of Overland Flow and Slow Rate Systems to Upgrade Secondary Wastewater Lagoon Effluent
SOURCE: Utah Water Research Laboratory, College of Engineering, Utah State University, Logan, Utah (72 pages)
YEAR : 1978
TEXT : To evaluate the effectiveness of overland flow treatment in upgrading secondary wastewater lagoon effluent, three plots with 2.5 percent slope were sown with reed canary grass, and wastewater was applied at the upper ends at rates of 7.5, 15 and 22.5 cm/wk. Results of the study were compared with similar data from an adjacent slow rate land application system. Site specific efficiencies are detailed. Overland flow may not be a suitable tertiary treatment process due to inadequate nitrification-denitrification process where land costs are low. The slow rate system can provide excellent tertiary treatment if groundwater is protected and no subsurface water collection and discharge is required. Otherwise, organic carbon and nutrient concentrations might be unacceptable, depending upon initial soil condition. (AU/SWF)

ACC# : L001376
AUTHOR: Sobsey, M.D., Dean, C.H., Jacobs, R.R., Knuckles, M.E., Wagner, R.E.
AFFIL : Department of Environmental Sciences and Engineering, University of North Carolina at Chapel Hill
TITLE : Survival and Fate of Enteric Viruses in Soil Treatment Systems for Wastewater
SOURCE: Report No. 168, Water Resources Research Institute of the University of North Carolina, 124 Riddick Building, North Carolina State University, Raleigh, North Carolina (40 pages)
YEAR : 1981
TEXT : Describes the results of laboratory and pilot scale studies of survival of poliovirus type 1 and reovirus type 3 in settled sewage treated in eleven different soils. Other variables studied include hydraulic conditions, soil microbial activity and wastewater characteristics. Clayey materials efficiently adsorbed both viruses over a range of pH and total dissolved solids (TDS), while sandy and organic soils were poor adsorbents, though virus adsorption for these soils sometimes increased at low pH and with added TDS or divalent cations. Viruses in soil suspension survived for considerable periods. Five-foot long and six-inch diameter columns having a three-foot, saturated bottom zones dosed with 1.3 inches of septic tank effluent per day showed high virus retention and inactivation even in less adsorbent soils, but rainfall effects may reduce this efficiency for sandy and organic soils. Clayey soils retained greater than 99.9995 percent virus removal even under conditions of simulated rainfall. (AU/SWF)

ACC# : L001377
AUTHOR: Massey, D.T.
AFFIL : Natural Resource Economics Division of Economics, Statistics, and Cooperative Service, U.S. Dept. of Agriculture
TITLE : Legal Issues Associated with Land Application of Municipal Wastewaters; Chapter V
SOURCE: Natural Resource Economics Division of Economics, Statistics, and Cooperative Service, U.S. Dept. of Agriculture (37 pages)
YEAR : 1979
TEXT : The purpose of this paper is to identify and describe the legal issues at both the federal and state levels associated with land application of municipal wastewaters and the effects land application systems have on private water rights under the law. The specific provisions of federal water pollution control legislation and U.S. Environmental Protection Agency (EPA) regulations that encourage and aid land treatment are discussed. Statutes and administrative rules, regulations, standards, criteria, and guidelines applicable to land treatment in some states are surveyed to evaluate their status of development and to provide examples of methods used to reduce water pollution and public health risks. Institutional alternatives for operating and financing systems and political organizations available to control application sites are discussed as well as the legal issues associated with land acquisition, storage lagoons, operating the application sites, drainage from the sites, monitoring, public health considerations, and crop selection. The interaction between land application systems and private water rights law is considered. (AU)

ACC# : L001378
AUTHOR: Cogger, C., Carlile, B.L., Osborne, D., Holland, E.A.
AFFIL : North Carolina State University, Soil Science Department
TITLE : Design and Installation of Mound Systems for Waste Treatment
SOURCE: North Carolina State University, UNC Sea Grant College Publication, UNC-SG-82-04 (33 pages)
YEAR : 1982
TEXT : The manual specifies the procedures and materials to be used for siting, design, installation and maintenance of residential mound systems. It is divided into nine sections: a general description of a mound system; site and soil requirements for mound systems; layout of a mound; fill, topsoil and gravel requirements; dosing and distribution system design; equipment specifications; installation procedures, inspection and maintenance; and mound design and installation on sloping ground. Examples and checklists are offered in the appendix. (SWF)

ACC# : L001379
AUTHOR: Baker, L.K.
AFFIL : Weatherby Associates, Inc., Jackson, California
TITLE : Experiences and Benefits of the Application of Minimum Flow Water Conservation Hardware
SOURCE: Proceedings of the National Conservation Conference on Publicly Supplied Potable Water, April 14-15, 1981, Denver, CO (8 pages)
YEAR : 1981
TEXT : Provides a background on minimum flow water conservation hardware and techniques. Presents an economic analyses of the impacts of minimum flow on an actual planned development. (SWF)

ACC# : L001380
AUTHOR: Stanford, G.
AFFIL : Greenhills Environmental Center, Cedar Hill, Texas
TITLE : The Home Woodlot as a Multi-Purpose Facility for Treatment and Disposal of Domestic Wastes
SOURCE: American Society of Agricultural Engineers, St. Joseph, Michigan (6 pages)
YEAR : 1978
TEXT : The use and management of a coppiced plantation (revegetated stumpwood) for treatment and disposal of domestic wastes is described. The annual coppice yield is increased when irrigated and manured with these wastes. (SWF)

ACC# : L001381
AUTHOR: Cogger, C., Carlile, B.L., Osborne, D., Holland, E.
AFFIL : North Carolina State University, Dept. of Soil Scienc, Raleigh, NC and Triangle J Council of Governments, Research Triangle Park, NC
TITLE : Design and Installatin of Low-Pressure Pipe Waste Treatment Systems
SOURCE: UNCA Sea Grant College Program, 105 1911 Building, North Carolina State University, Raleigh, NC (32 pages)
YEAR : 1982
TEXT : This manual is intended for use by sanitarians, contractors, architects, and engineers; it covers design, installation, and maintenance of small

low-pressure pipe systems (LPP) suitable for homes and small businesses. LPP is a modified septic system created for use in soils not suitable for onsite sewage disposal by conventional systems. Detailed information is provided regarding site and soil requirements, system layout and design of dosing and distribution system. It provides equipment specifications and installation procedures. Separate chapters are devoted to system design on sloping ground, modified fill systems and inspection and maintenance. (AU/SWF)

ACC# : L001382
AUTHOR: Lance, J.C., Gerba, C.P., Wang, D.S.
AFFIL : National Program Staff, USDA-ARS, Beltsville, MD, Dept. of Microbiology and Nutrition and Food Service, University of Arizona, Tucson, and University of Texas Medical School, Houston
TITLE : Comparative Movement of Different Enteroviruses in Soil Columns
SOURCE: Journal of Environmental Quality, 22(3):347-351 (5 pages)
YEAR : 1982
TEXT : Echo 1 and 29 are chosen as test strains to compare with poliovirus in various soil-virus adsorption tests with soil columns. Tests under a wide range of laboratory and field conditions suggest that poliovirus type 1 behavior is not significantly different from that of the other enteroviruses studied in long soil columns. Virus movement through the soil column roughly parallel coliform movement. These results suggest that studies using poliovirus type 1 can be valuable in determining the behavior of other enteroviruses in soil and water systems. (AU/SWF)

ACC# : L001383
AUTHOR: Guttormsen, D.
AFFIL : Institute of Microbiology, Agriculture University, As, Norway
TITLE : Evaluation of Compost Toilets-A Field and Laboratory Update
SOURCE: Individual Onsite Wastewater Systems - Proceedings of the Sixth National Conference, 1978, Ann Arbor Science Publishers, Inc., Ann Arbor, MI (8 pages)
YEAR : 1979
TEXT : A description of various composting toilets and their evaporation needs is given. Eleven different composting toilet modes were laboratory tested. Most of the models worked if properly installed and maintained. A field project is currently underway. (SWF)

ACC# : L001384
AUTHOR: Kreissl, J.F.
AFFIL : Urban Systems Management Section, Municipal Environmental Research Laboratory, U.S. Environmental Protection Agency, Cincinnati, Ohio
TITLE : Regulations and Policy Regarding On-Site Wastewater Disposal Systems
SOURCE: Onsite Wastewater Disposal Systems, p. 303-320 (18 pages)
TEXT : Overviews the development of onsite wastewater disposal regulations and policy changes by analyzing four surveys spanning 33 years. Stresses that the lack of a federal standard code in the United States has led to the subsequent dynamic changes in state and local codes. Lists national and regional documents which provide guidance for onsite system design. (AU/SWF)

ACC# : L001385
AUTHOR: Calhoun, D.E., Cobb, D., Sutherland, J.R.
AFFIL : Thetford Corporation, Ann Arbor, MI; Village Centre Partnership, Great Falls, VA; and Dept. of Health, Commonwealth of Virginia, Richmond, VA
TITLE : Case B-Village Centre: Onsite Waste Treatment at a Commercial Complex
SOURCE: Individual Onsite Wastewater Systems - Proceedings of the Sixth National Conference, 1978, Ann Arbor Science Publishers, Inc., Ann Arbor, MI (8 pages)
YEAR : 1978
TEXT : Describes an onsite wastewater treatment system designed for a suburban commercial complex. The system recycles treated greywater and blackwater for use in very low flush toilets. Self-closing metered faucets , aerators and flow control devices conserve water which is ultimately discharged into a one-acre onsite soil leaching system. (SWF)

ACC# : L001386
AUTHOR: U.S. EPA
AFFIL : U.S. EPA
TITLE : Final Generic Environmental Impact Statement for Wastewater Management in Rural Lake Areas
SOURCE: United States Environmental Protection Agency, Region V, Chicago, Illinois and WAPORA, Inc. (323 pages)
TEXT : This final environmental impact statement examines the environmental, economic and social costs within Region V of rural lake wastewater planning especially as funded and managed under the Clean Water Act. It

reviews and analyzes facilities planning and environmental review methods for rural lake areas.

It uses seven sample projects of this type to present specific recommendations about development and management of on-site and small scale alternatives to conventional wastewater treatment. It recommends specific methods to document project need and water quality impact. It concludes that wherever continued operation of a substantial percentage of existing systems is feasible, a wastewater management program based on optimum operation of existing systems will result in substantial savings in capital and present worth costs.

The EIS offers a complete manual for planning, construction and management of decentralized rural lake projects with or without federal or state assistance. It can be used, and contains specific advice for projects operating under both old (1977) and new (1981) Construction Grant Amendments. Reasonable use of the methods outlined here for construction grant applications already in hand will result in an estimated savings exceeding $460 million in Region V alone. (AU)

ACC# : L001387
AUTHOR: Neil, J.H.
AFFIL : Limnos Ltd., Ontario, Canada
TITLE : The Harvest of Biological Production as a Means of Improving Effluents from Sewage Lagoons
SOURCE: Environment Canada, Research Report, No. 38 (41 pages)
YEAR : 1976
TEXT : Presents research in the feasibility of removing phosphorus, nitrogen and organic matter through the harvesting of algae, duckweed, daphniae or midge larva from five Ontario sewage lagoons. Discusses possible means of increasing production and harvesting methods. (SWF)

ACC# : L001388
AUTHOR: U.S. EPA
AFFIL : U.S. Environmental Protection Agency, Facilities Requirements Division, Washington, DC
TITLE : Managing Small and Alternative Wastewater Systems
SOURCE: U.S EPA, Facilities Requirements Division, Washington, DC (134 pages)
YEAR : 1982
TEXT: Examines some of the unique problems and opportunities associated with the management of small alternative wastewater systems (SAWS). The introductory material covers components of a SAWS management program and planning methodology. Five key issues discussed in depth are: personal and property rights and SAWS liability, participation, costs, finances, and use of private firms in SAWS management. Five actual case studies are also presented. (AU/SWF)

ACC# : L001389
AUTHOR: NA
AFFIL : NA
TITLE : Alternatives to Sewers
SOURCE: Conference Proceedings - Old Colony Planning Council and the EPA, Ridder Country Club, E. Bridgewater, MA, December 2-3, 1976 (139 pages)
YEAR : 1976
TEXT : The proceedings from the "Alternatives to Sewers" Conference explores issues related to non-sewered alternatives. They are divided into the following sessions: septic system technology; siting and installation; maintenance and repair of septic systems; public administration; land use/growth impacts; alternative systems for single family homes; systems for apartments, clusters of older homes, subdivisions; and legal/financial issues. Question and answer periods are recorded at the end of each session. (AU/SWF)

ACC# : L001390
AUTHOR: Barnett, E.L.
AFFIL : Division of Environmental Sanitation, Tennessee Department of Public Health, R.S. Gass State Office Building, Ben Allen Road, Nashville, Tennessee
TITLE : An Approach to Failing Subsurface Disposal System
SOURCE: Individual Onsite Wastewater Systems - Proceedings of the Eighth National Conference, 1981, Ann Arbor Science Publishers, Inc., Ann Arbor, MI (7 pages)
YEAR : 1982
TEXT : Describes Tennessee's experience with three types of subsurface disposal system failure: effluent surfacing, groundwater contamination and sewage backup into plumbing fixtures. Summarizes data compiled by county environmentalists for approximately 6,900 failing systems. The majority of which were more than five years old. The top two causes of failure were inadequate amount of line and unfavorable soil absorption capacity. Major sources of failure and possible remedies are discussed.

(SWF)

ACC# : L001391
AUTHOR: Pacheco, M.A., Gray, D.D., Barber, M.E.
AFFIL : Hydraulics and Systems Engineering Area, School of Civil Engineering, Purdue University, West Lafayette, Indiana
TITLE : Computer Aided Design of Vacuum Sanitary Sewerage Systems
SOURCE: Hydraulics and Systems Engineering, Report No. CE-HSE-82-2, January, 1982 (61 pages)
YEAR : 1982
TEXT : This report presents a Fortran computer program for the design of vacuum sanitary sewerage systems using the criteria and procedures recommended by a leading supplier of vacuum sewer components, the AIRVAC Division of Burton Mechanical Contractors, Inc. Given the horizontal layout of the collection pipe network, the program specifies the invert elevations, lift heights, and pipe sizes necessary for successful operation of the system. The program summarizes the quantities of pipe needed to construct the system and sizes the components of the central collection station. This report describes the algorithm which is used, explains the input procedures, and contains a complete listing of the program. An example problem is presented, and suggestions for further development are offered. (AU)

ACC# : L001392
AUTHOR: Rybczynski, W., Polprasert, C., McGarry, M.
AFFIL : International Development Research Centre and the World Bank, Book 8500, Ottawa, Canada K1G 3H9, Head Office, 60 Queen Street, Ottawa
TITLE : Low-Cost Technology Options for Sanitation - A State-of-the-Art Review and Annotated Bibliography
SOURCE: International Development Research Centre and the World Bank, Book 8500, Ottawa, Canada K1G 3H9, Head Office 60 Queen Street, Ottawa (184 pages)
YEAR : 1982
TEXT : A technology review and bibliography illustrate alternative approaches to collection, treatment, reuse and disposal of human wastes. Part one addresses the following subjects: options for excreta disposal in hot climates, techniques for reusing human wastes, and the waste disposal/reuse options for cities and towns. Part two describes the state of the literature and the literature search. Part three is the bibliography developed and divided into six categories. The six categories are deposition devices, onsite collection and treatment, collection and off-site treatment, reuse, greywater, and water-saving. Indexes of keywords and authors along with a glossary of selected technical terms, are provided. (SWF)

ACC# : L001393
AUTHOR: Witherow, J.L., et al
AFFIL : Robert S. Kerr, U.S. EPA, Environmental Research Laboratory, Ada, Oklahoma
TITLE : New Natural I/A Technology
SOURCE: National State/Federal I/A Coordinator's Meeting, Denver, Colorado, October 26-29, 1982 (37 pages)
YEAR : 1982
TEXT : Presents results from the following natural wastewater land treatment studies: 1) Physical Designs of Overland Flow Systems, 2) Algae Removal by the Overland Flow Process, 3) The Use of Artificial Wetlands to Remove Nitrogen from Wastewater, and 4) A Critique of the Lubbock, Texas, Slow Rate Land Application System. (AU/SWF)

ACC# : L001394
AUTHOR: Viraraghaven, T., Landine, R.C., Winchester, E.L., Jenkins, G.H.
AFFIL : ADI Limited, Fredericton, N.B., Canada and Parks Canada, Halifax, N.S., Canada
TITLE : Design and Operation of Two Rotating Biological Contactor Plants at Fundy National Park, New Brunswick, Canada
SOURCE: Unknown
TEXT : Evaluates rotating biological contactor equipment treating septic tank effluent in remote Canadian communities. Describes the design features, the operational controls and the performance of two RBC systems. (SWF)

ACC# : L001395
AUTHOR: Ward, R.C., Ruiter, J.B., Hansen, R.W.
AFFIL : Agricultural and Chemical Engineering Dept., Colorado State University, Fort Collins, Colorado
TITLE : Wastewater Management Alternatives for Small Colorado Communities
SOURCE: Cooperative Extension Service, Colorado State University, Fort Collins, Colorado, Bulletin 512A, (21 pages)
YEAR : 1983
TEXT: An Extension Service bulletin introduces small Colorado communities to

alternative domestic wastewater management methods. Describes technological options for treating wastewater and potential arrangements for providing ongoing operations and maintenance. Emphasizes "total management" (planning, design, installation, operation and maintenance) and offers possible institutional arrangements. Illustrated with a technical evaluation of management alternatives for Roaring Creek Valley in Colorado. (SWF)

ACC# : L001396
AUTHOR: Donnermeyer, J.F.
AFFIL : Department of Agricultural Economics, Purdue University
TITLE : Socio-Cultural Factors Associated with the Utilization of Municipal Waste on Farmland for Agricultural Purposes
SOURCE: Wastewater Management in Rural Communities: A Socio-Economic Perspective - Information Report 103, The Pennsylvania State University, p. 69-89 (21 pages)
YEAR : 1980
TEXT : Social and cultural factors influence a farmer's decision to participate in farmland sludge or septage application programs. The process by which controversies grow is discussed: the value system of rural areas is reviewed; and potential sources of controversy related to the disposal of treated wastewater in rural areas, along with a format within which the benefits and costs of farmland application may be evaluated, are outlined. The paper recommends trying to "sell" treated waste as a method for utilizing a renewable resource and not as a solution to a disposal problem. (AU/SWF)

ACC# : L001397
AUTHOR: Miller, D.
AFFIL : Wright and Company, Newport Beach, CA
TITLE : A System for High-Slope Lots
SOURCE: Individual Onsite Wastewater Systems - Proceedings of the Sixth National Conference, 1978, Ann Arbor Science Publishers, Inc., Ann Arbor, MI, (4 pages)
YEAR : 1979
TEXT : An onsite domestic wastewater disposal system for high slope areas is described. The system consists of a main septic tank, a cascade tank, a distribution box and a sand filter followed by a terraced absorption field. (SWF)

ACC# : L001398
AUTHOR: Grottkau, W.A., Le, T.K.
AFFIL : Office of Transportation Laboratory, California Dept. of Transportation, Sacramento, California
TITLE : A Design Method for Roadside Rest Septic Tank Leach Field Systems
SOURCE: California Department of Transportation, Sacramento, California (146 pages)
YEAR : 1981
TEXT : The California Department of Transportation conducted research to determine reliable criteria for the design and maintenance of roadside rest area sewage systems. The number of vehicles discharging at the trailer sanitation stations and the number of vehicles leaving the roadside rest were determined; restroom wastewater usage was directly related to axle counts. Data provide the information and technique necessary to design a new roadside rest septic tank-leach field system. (AU/SWF)

ACC# : L001399
AUTHOR: Murthy, R.K.
TITLE : A Manual on Compost and Other Organic Manures
SOURCE: Today & Tomorrows Printers and Publishers, 24B/5 Deshbandhu Gupta Road, New Delhi, India 110005
YEAR : 1978
TEXT : Discusses composting and utilization of organic manures. Covers a brief historical development. Cardinal points in the composting of refuse, night-soil and farm wastes are segregation and shredding of refuse, optimum carbon-nitrogen ratio, moisture content, aeration, temperature, and fly-control. Additional topics include: sewage utilization in agriculture, farmyard manure conservation, "green" manures, aerobic and anaerobic decomposition of organic matter, oil cakes and other organic manures. (SWF)

ACC# : L001400
AUTHOR: Irvine, R.L., Ketchum, L.H., Breyfogle, R., Barth, E.F.
AFFIL : Dept. of Civil Engineering, University of Notre Dame, Indiana; Indiana Wastewater Treatment Plant; and U.S. EPA, Cincinnati, Ohio
TITLE : Municipal Application of Sequencing Batch Treatment at Culver, Indiana
SOURCE: Journal Water Pollution Control Federation, (17 pages)

YEAR : 1982
TEXT : An operating summary of a full-scale demonstration of a two-tank sequencing batch reactor (SBR) activated sludge treatment plant is presented. A description of the treatment facility, conversion procedures and operation are given. The SBR is found to be a viable alternative to conventional continuous flow activated sludge treatment of domestic wastewaters for BOD-5 and SS removals, nitrification, denitrification and chemical precipitation of phosphorus. (AU/SWF)

ACC# : L001401
AUTHOR: Machmeier, R.E.
AFFIL : Extension Agricultural Engineer
TITLE : Shoreland Sewage Treatment: Recommendations for Identifying and Eliminating Nonconforming Systems
SOURCE: Extension Bulletin 394, Dept. of Agricultural Engineering, University of Minnesota, St. Paul, Minnesota (16 pages)
YEAR : 1978
TEXT : Describes state, local and individual responsibilities under Minnesota's Shoreland Management Act. Nonconforming sewage disposal systems are those systems not properly designed, installed or located which often create serious problems. Provides information on the identification of nonconforming systems. Describes action programs instrumental in eliminating nonconforming systems. (SWF)

ACC# : L001402
AUTHOR: Wilborn, D.F.
AFFIL : Metropolitan Watersaving Company, Washington, DC
TITLE : Water-Saving Plumbing: A Flow Control and Maintenance Program to Reduce and Control Water Use in Multi-Housing Properties
SOURCE: Proceedings of the National Conservation Conference on Publicly Supplied Potable Water, April 14-15, 1981, Denver, CO (5 pages)
YEAR : 1981
TEXT : To assure that flow control devices provide a significant reduction in water consumption, a manufacturer of flow control devices decided to market the devices through a water management program for multi-housing properties. Phases of the program include: 1) analysis of water use, 2) survey of building/unit fixtures, 3) installation service to assure standarized flow rate on a per unit basis, and 4) monitoring service follow-up. Several recent job consumption figures illustrate the benefits of flow control devices when used as a part of a complete water management program. (AU/SWF)

ACC# : L001403
AUTHOR: Machmeier, R.E.
AFFIL : Extension Agricultural Engineer, University of Minnesota
TITLE: Designing Sewage Treatment Systems for Resorts
SOURCE: Extension Bulletin 459 - 1981, Agricultural Extension Service, University of Minnesota, St. Paul Minnesota (15 pages)
YEAR : 1981
TEXT : Describes design procedures for several types of septic tank treatment systems applicable to recreational areas. Includes information on estimating sewage flows, sizing, types, designing, effluent pumping stations, effluent collection sewers, permits, and operation and maintenance. Provides an example of a resort area. (SWF)

ACC# : L001404
AUTHOR: Leland, D.F., Hillel, D.
AFFIL : Arthur D. Little, Inc., Cambridge, MA and Dept. of Plant and Soil Sciences, Univ. of Massachusetts, Amherst, MA
TITLE : A Field Study of Solute Dispersion in a Shallow, Unconfined Aquifer
SOURCE: Soil Science Society of America Journal, 46(5):905-912 (8 pages)
YEAR : 1982
TEXT : A natural gradient tracer test was performed to (i) characterize the patterns of variation of saturated hydraulic conductivity and longitudinal dispersivity in a shallow unconfined aquifer in a sandy soil on a sloping site and to (ii) examine scale effects on quantificaiton of longitudinal dispersivity. Chloride tracer was injected into the saturated zone, and its downslope movement was monitored by means of multilevel samplers. Results show that the mean value of hydraulic conductivity derived from the tracer test was in close agreement with values obtained independently on undisturbed core samples and from double-ring infiltrometer tests performed insitu. (AU/SWF)

ACC# : L001405
AUTHOR: Simmons, J.D., Newman, J.O.
AFFIL : U.S. Dept. of Agriculture, Agricultural Research Service, Rural Housing Research Unit, P.O. Box 0792, Clemson, South Carolina

TITLE : Design Workbook for Small-Diameter, Variable-Grade, Gravity Sewers
SOURCE: U.S. Dept. of Agriculture, Agricultural Research Service, Rural Housing Research Unit, P.O. Box 0792, Clemson, South Carolina
YEAR : 1982
TEXT : Paper from FmHA Agricultural Engineering training session describes the variable-grade effluent gravity sewer concept and its application in the rural community sewage system at Mt. Andrew, Alabama. Presents design consideration and sample problems with solutions. Includes a computer program for variable grade system design. (SWF)

ACC# : L001406
AUTHOR: Warkentin, B.P., Harward, M.E.
AFFIL : Oregon State University
TITLE : Potential of Soil as Treatment Medium for On-Site Waste Disposal
SOURCE: Proceedings of 2nd Northwest On-site Wastewater Disposal Short Course, University of Washington, March 1 & 2, 1978 (11 pages)
YEAR : 1978
TEXT: Soil characteristics determine the potential of a soil as a treatment medium for onsite waste disposal. Permeability, and depth, water table, weather and land slope must be taken into account in designing for specific local conditions. Presents a summary of experimental studies of water and coliform movement in sloping hillside areas. Measurements using dye showed that water movement did not occur uniformly throughout the soil but was confined to cracks and large voids in the soil. The movement of bacteria was also non-uniform and occurred through large channels in the soil. Comparisons between movement of dye and bacteria showed that tagged bacteria were much more sensitive than dyes and could result in detection of failures which were not diagnosed with dyes. (AU/SWF)

ACC# : L001407
AUTHOR: Bowles, E.J.
AFFIL : Texas A & M University, College Station, Texas
TITLE : Pressurized Waste Water Collection
SOURCE: Texas Water Utilities Association's 55th Short School, Texas A & M University, College Station, Texas, March 6, 1973 (17 pages)
YEAR : 1973
TEXT : Describes the concept of a pressurized sewer system and presents several case studies. Flushing programs, centralized management and an alarm system for grinder pumps are suggested from the observation. (SWF)

ACC# : L001408
AUTHOR: Janni, K.A., Nye, J.C., Jones, D.D., Krutz, G.W., Yahner, J.E.
AFFIL : University of Minnesota, St. Paul
TITLE : Finite Element Analysis of Effluent Flow from Subsurface Sewage Disposal Fields
SOURCE: Transactions of the ASAE, 23(2):336-342 (7 pages)
YEAR : 1980
TEXT : A finite elements analysis of the effluent flow from a subsurface disposal field studied four parameters: soil hydraulic conductivity, organic mat hydraulic conductivity, column base hydraulic head and soil surface hydraulic head. The finite element computer program determined the failure loading rate for each disposal field flow situation. It was found that the disposal field failure loading rate increases when the soil hydraulic conductivity and/or the organic mat hydraulic conductivity increases. It was determined that reducing the organic mat hydraulic conductivity reduces the soil hydraulic conductivity and may significantly reduce the loading rate enough to cause a very permeable soil to lose the advantage of its greater hydraulic conductivity. Finally, it was determined that the disposal field loading rate decreased linearly as the subsoil hydraulic head and/or the surface hydraulic head increased. (AU/SWF)

ACC# : L001409
AUTHOR: Otis, R.J.
AFFIL : Dept. of Civil and Environmental Engineering, University of Wisconsin, Madison, Wisconsin
TITLE : Site Evaluation for Soil Absorption Systems
SOURCE: Proceedings of 2nd Northwest On-site Wastewater Disposal Short Course, University of Washington, March 1 & 2, 1978 (22 pages)
YEAR : 1978
TEXT : Examines the parameters necessary for a proper site evaluation of septic tank and soil absorption systems. Presents modifications for sites with excessive slopes, high groundwater and shallow bedrock. (SWF)

ACC# : L001410
AUTHOR: Skinde, R.T., Tracey, R.M., Schmidt, H.E.
AFFIL : Tracey & Brunstrom Company, Seattle, Washington, and General Development

Utilities, Inc., Miami, Florida
TITLE : Transporting Septic Tank Effluent by Pressure Systems
SOURCE: Proceedings of 2nd Northwest On-site Wastewater Disposal Short Course, University of Washington, March 1 & 2, 1978 (11 pages)
YEAR : 1978
TEXT : The developers of pressure sewer technology list advantages of septic tank effluent pump and grinder pump pressure sewers and assess the present-day development of the 20-year old Port Charlotte, Florida, pressure sewer system. Describes the function of the four basic parts of the STEP system: disposal chamber, effluent or discharge chamber, effluent lines and plant treatment. (AU/SWF)

ACC# : L001411
AUTHOR: Otis, R.J.
AFFIL : Dept. of Civil and Environmental Engineering, University of Wisconsin, Madison, Wisconsin
TITLE : Costs of On-Site Treatment and Disposal Systems
SOURCE: Proceedings of 2nd Northwest On-site Wastewater Disposal Short Course, University of Washington, March 1 & 2, 1978 (4 pages)
YEAR : 1978
TEXT : Provides a table for installed costs (1976) and costs of operation and maintenance of onsite system components. In the area of onsite systems a more detailed analysis of costs cannot be accurately made. Too many factors affect costs in this rapidly changing field. (AU/SWF)

ACC# : L001412
AUTHOR: Seabloom, R.W., Engeset, J.
AFFIL : Dept. of Civil Engineering, University of Washington, Seattle, Washington
TITLE : An Appraisal of Composting Toilets
SOURCE: Proceedings of 2nd Northwest On-site Wastewater Disposal Short Course, University of Washington, March 1 & 2, 1978 (14 pages)
YEAR : 1978
TEXT : Overviews the biological decomposition processes involved in aerobic and anaerobic composting. Environmental factors that influence composting including the microbial population, temperature, moisture, pH, C/N and aeration. Composting model units from a Scandinavian study are categorized into three major groups: large toilets with slanting reservoirs, large toilets of box design and small toilets with heating elements. Figures and performance data for the three categories are provided. (AU/SWF)

ACC# : L001413
AUTHOR: DeJounge, L.
AFFIL : Enviroscope, Inc., Corona del Mar, California
TITLE : The Toa-Throne - A New Compost Toilet
SOURCE: Compost Science, September, October, 1976 (2 pages)
YEAR : 1976
TEXT : The Toa Throne is a small composting toilet which processes both human and kitchen wastes. The toilet has a stepped and perforated slanting bottom to the decay container to increase aeration. Article provides data on end product composition, loading rates, temperatures, and volume reduction. (SWF)

ACC# : L001414
AUTHOR: Abney, J.L.
AFFIL : Appalachian Environmental Demonstration Project, Dept. for Natural Resources and Environmental Protection, Corbin, Kentucky
TITLE : On-Site Sewage Disposal Systems - Technical Considerations and Recommended Design Approaches
SOURCE: Appalachian Environmental Demonstration Project, Dept. for Natural Resources and Environmental Protection, Corbin, Kentucky (34 pages)
YEAR : 1973
TEXT : Onsite disposal systems in Appalachia can be designed to provide low-maintenance, 35-year wastewater disposal at an average cost of less than $1,000, with a maximum cost of approximately $2,000 for the most difficult sites. The treatment and disposal of septic tank effluents by natural and modified soil systems, as well as physical and chemical factors of receiving soils, are discussed. Provides design information for trench absorption, hillside trench absorption, artificial drainage, mounds, evapotranspiration beds and sand filters. (SWF)

ACC# : L001415
AUTHOR: Veneman, P.L.M.
AFFIL : Dept. of Plant and Soil Sciences, University of Massachusetts, Amherst, Massachusetts
TITLE : The Septic Tank as a Wastewater Treatment and Disposal Facility
SOURCE: Water Resources Research Center, University of Massachusetts, Amherst,

Massachusetts (45 pages)
YEAR : 1982
TEXT: A University of Massachusetts study discusses the importance of groundwater, percolation rates and population density in proper septic tank/soil absorption system design. A detailed table specifies the soil limitations of Massachusetts soils for onsite sewage disposal systems. Management practices are suggested to overcome these limitations. Leaching area requirements are evaluated on the basis of insitu hydraulic conductivity measurements. Results indicate the sizing criteria in the Massachusetts health codes are conservative and have sufficient margins of safety to provide adequate treatment and safe disposal of wastewater. (AU/SWF)

ACC# : L001416
AUTHOR: Engeset, J., Seabloom, R.W.,
AFFIL : Dept. of Civil Engineering, University of Washington
TITLE : Effluent Treatment by Mounds
SOURCE: Proceedings of 2nd Northwest Onsite Wastewater Disposal Short Course, University of Washington, March 1 & 2, 1978 (26 pages)
YEAR : 1978
TEXT : The feasibility of the mound system was investigated for use under conditions unsuitable for conventional onsite wastewater disposal systems. Performance of the septic tank-mound treatment system was evaluated by two criteria: the average effluent quality produced and the variability in effluent quality. Samples were analyzed for BOD-5, COD, nitrogen (ammonia and nitrite-nitrate), phosphorus (total phosphorus and orthophosphate) and fecal coliform. Performance, as illustrated by graphs and tables, was excellent even under the stressed condition of heavy rainfall during the winter months. (AU/SWF)

ACC# : L001417
AUTHOR: Wilson, S.A., Paeth, R.C., Ronayne, M.P.
AFFIL : Oregon Dept. of Environmental Quality and CES Ltd., P.O. Box 137, Corbett, OR
TITLE : Effect of Tile Drainage on Disposal of Septic Tank Effluent in Wet Soils
SOURCE: Journal of Environmental Quality, 11(3):372-375 (4 pages)
YEAR : 1982
TEXT : A field-performance study was conducted in Oregon to determine the feasibilty of artificially draining wet soils to permit satisfactory operation of septic tank effluent disposal fields. Tile drains placed at 1.2 and 1.8 meters deep with 3- and 6-meter horizontal separations, respectively, around disposal fields were monitored during wet winter months. Tile placed at either depth lowered groundwater sufficiently to prevent saturated soil conditions in disposal fields. Results indicated that design specifications were a practical means of overcoming wetness limitations for onsite sewage disposal on drainable soils in western Oregon. (AU)

ACC# : L001418
AUTHOR: Johnson, M.
AFFIL : Division of Water Resources, Department of Natural Resources
TITLE : Innovative and Alternative Technology: A Success or Failure in West Virginia
SOURCE: Mountain Currents, 1(2):11-12 (2 pages)
YEAR : 1982
TEXT : Discusses innovative/alternative (I/A) projects in West Virginia that have been funded or are awaiting approval. The mandatory reserve of funds for I/A projects for West Virginia was not fully utilized, with $1,190,492 being returned to the federal treasury. One reason cited was that no large scale I/A technologies have been demonstrated in West Virginia even though these systems have been successfully proven in other parts of the country. (AU/SWF)

ACC# : L001419
AUTHOR: Weston, R.F.
AFFIL : Roy F. Weston, Inc., Designers-Consultants, Weston Way, West Chester, Pennsylvania 19380
TITLE : Management of On-Site and Small Community Wastewater Systems: Guide for Developing Institutional Arrangements for the Management of Small Wastewater Systems
SOURCE: US-EPA, Municipal Environmental Research Laboratory, Cincinnati, Ohio 45268 (239 pages)
TEXT: Presents the institutional aspects of small wastewater management in three parts. The first part, an overview of the management program formulation process, includes general observations and recommendations. An example illustrates the steps and decisions normally made in developing a management program. The second part, an analyses of methodology, is a technical reference which provides a detailed

methodology for evaluating and selecting institutional components of wastewater management programs. The section describes and evaluates institutional options for implementing management functions. Part three is an appendix which includes information for persons setting up management programs. (SWF)

ACC# : L001420
AUTHOR: Young, C.E.
AFFIL : Natural Resource Economics Division, Economics, Statistics, and Cooperatives Service, Pennsylvania State University, University Park, PA
TITLE : Upgrading Municipal Wastewater Treatment in Rural Areas
SOURCE: Symposium on Impacts on Rural America of the Federal Water Pollution Control Act - Presented at the joint annual meeting of the American Agricultural Economics Association and the Western Agricultural Economics Assoc., Aug. 2, 1977 (12 pages)
YEAR : 1977
TEXT : Upgrading the level of wastewater treatment as mandated by PL 92-500 will have a serious impact on rural economics. Rural communities are penalized by economies of size in treatment processes. Many rural communities do not even have a collection system in place. An examination of EPA construction grant awards indicates that small communities have received fewer grant awards than larger communities and that smaller communities have not received more grant dollars per capita than larger communities. A second major impact of PL 92-500 on rural communities is the increased emphasis on land application as a method of advanced wastewater treatment sludge disposal. For smaller communities, land application of sewage effluents is an economical method for advanced wastewater treatment. (AU/SWF)

ACC# : L001421
AUTHOR: Niehus, D.C.
AFFIL : Municipal Environmental Research Laboratory, U.S. EPA, Cincinnati, Ohio
TITLE : On-Site and Alternative Wastewater System Management: Bibliography
SOURCE: Proceedings Wastewater Alternatives for Small Communities, U.S. EPA, Cincinnati, Ohio (10 pages)
YEAR : 1981
TEXT : A bibliography of onsite and alternative wastewater systems management was prepared for the 1978 U.S. EPA Training Seminar for Wastewater Alternatives for Small Communities. Containing 119 citations, the bibliography emphasizes the management aspects of small systems. (SWF)

ACC# : L001422
AUTHOR: Mott, T.D., Fritton, D.D., Petersen, W.
AFFIL : U.S. EPA, Ann Arbor, Michigan
TITLE : Flow Calculations for Household Effluent Disposal in Elevated Sand Mounds
SOURCE: Journal of Environmental Quality, 10(3):311-314 (4 pages)
YEAR : 1981
TEXT : Flow calculations are presented for wastewater effluent disposal in elevated sand mounds. Method of evaluating the ability of a soil to transmit effluent from an elevated sand mound to a groundwater system was developed by separating the effluent flow into horizontal and vertical components. The calculations permit the definition of water-flow criteria which then define the data requirements for the evaluation of a specific site suitable for disposal of household effluents using a mound system. (AU/SWF)

ACC# : L001423
AUTHOR: Gerardi, M.H.
AFFIL : Williamsport Sanitary Authority, Williamsport, PA
TITLE : Using Sludge on Land Raises More Than Crops
SOURCE: Pollution Engineering, 14(9):27-30 (4 pages)
YEAR : 1982
TEXT : Addresses nitrate, odor and pathogen problems associated with land disposal of sludge, and gives a sample calculation for nitrogen loading. Tables present nitrogen utilization data for selected crops and precautionary measures for cropland utilization of sewage sludge. (SWF)

ACC# : L001424
AUTHOR: Watts, F.C., Huckle, H.F., Paetzold, R.F.
AFFIL : Soil Conservation Service, Soil Survey Party Leader, USDA, DeFuniak Springs, Florida
TITLE : Field vs. Laboratory Determined Hydraulic Conductivities of Some Slowly Permeable Horizons

SOURCE: Soil Science Society of America Journal 46(4):782-784 (3 pages)
YEAR : 1982
TEXT: Saturated hydraulic conductivities of soils of spodic and argillic horizons were measured in several Florida soils. The soils were Haplaquods, Haplohomods, Glossaqualfs, and Argiaquolls. Two methods of measurement were compared. The core method consistently gave larger hydraulic conductivity values than the piezometer method. The lowest soil conductivity rates were in argillic horizons. The permeability classification of most soils studied depended upon the measurement method used. (AU)

ACC# : L001425
AUTHOR: Asbury, R., Hendrickson, C.
AFFIL : New Mexico Environmental Improvement Division, P.O. Box 965, Las Cruces, NM
TITLE : Aerobic On-Site Systems Studied in New Mexico
SOURCE: Journal of Environmental Health 45(2):56-87 (2 pages)
YEAR : 1982
TEXT : A limited study of aerobic treatment units was conducted to determine whether units are functioning satisfactorily and the cause of malfunction. Results indicate that aerated units have more problems than standard septic tank units. It seems that most units do not operate as long as they should or don't operate at all. They have possibilities for odor and noise problems. On sites suitable for subsurface discharge, septic tanks rather than aerobic units have the advantage. (SWP)

ACC# : L001426
AUTHOR: Hawkins, P.M.
AFFIL : International Reference Centre for Wastes Disposal, Swiss Federal Institute for Water Resources and Water Pollution Control (EAWAG), Ueberlandstrasse 133, CH-8600 Dubendorf, Switzerland
TITLE : Emptying On-Site Excreta Disposal Systems in Developing Countries: An Evaluation of the Problems
SOURCE: IRCWD News, No. 17, August 1982, Ueberlandstrasse 133, CH8600 Dubendorf, Switzerland (15 pages)
YEAR : 1982
TEXT : Presents currently available pit latrine emptying technology for developing countries along with problems and case studies of currently operating services. The major technological problem in pit emptying services is the non-fluid behavior of sludge. To adapt fluid handling technologies for pit emptying, a mechanical device for shearing and adding water to the sludge would have to be developed. Key discussions in pit emptying service management include the adoption of a transfer system and scheduling and zoning of collections. (SWF)

ACC# : L001427
AUTHOR: Konen, T.P.
AFFIL : Building Technology Research Division, Davidson Laboratory, Stevens Institute of Technology, Hoboken, New Jersey
TITLE : Performance Requirements and Test Procedures for Water Closets
SOURCE: Proceedings of the National Water Conservation Conference on Publicly Supplied Potable Water, April 14-15, 1981, Denver, CO (8 pages)
TEXT : Describes test methods for use by industry, code groups, enforcement agencies and others to determine the functional performance of water closets and thereby provide safe and efficient designs and installations. The primary characteristics of the water closets for which test methods and procedures were developed include: surface cleansing, waste removal including solids and liquids, and volumetric efficiency. A test kit containing media, instructions and data sheets is available to industry and the general public. (AU/SWF)

ACC# : L001428
AUTHOR: Avnimelech, Y., Nevo, Z.
AFFIL : Technion, Israel Institute of Technology, Haifa, and Weizmann Institute of Science, Rehovoth
TITLE : Biological Clogging of Sands
SOURCE: Soil Science, Vol. 98:222-226 (5 pages)
YEAR : 1964
TEXT : Studies the influence of added organic matter on clogging of sands during prolonged percolation. Tap water and nitrogenous solutions were percolated through sand columns mixed with various substances. High carbon-to-nitrogen ratios induced a relatively long-lasting clogging, while low carbon to nitrogen ratios caused clogging for only a short period. Hardly decomposable materials caused only a slight clogging. A linear correlation was found between the concentration of polyuronides in the extent of clogging. A relationship between the mechanisms of clogging and aggregation was also observed. (AU/SWF)

ACC# : L001429
AUTHOR: Rubin, A.R., Carlile, B.L.
AFFIL : Biological and Agricultural Engineering, North Carolina State University, Raleigh, North Carolina
TITLE : Large-Scale Onsite Systems
SOURCE: Individual Onsite Wastewater Systems - Proceedings of the Eighth National Conference, 1981, Ann Arbor Science Publishers, Inc., Ann Arbor, Michigan (14 pages)
YEAR : 1982
TEXT : Discusses some of the problems associated with developing large-scale systems and describes some of the operational characteristics of the systems that have been operating in North Carolina. Items to evaluate the suitability of onsite and/or large-scale systems include reliability, efficiency, aesthetics, flexibility, capacity, environmental impact, cost and siting. Three major factors: water flow and characterization, soil characteristics and site characteristics to be evaluated in systems planning, are presented with compiimentary tables. Case studies describe modification and/or new technology implementation in North Carolina, including flow reduction devices, low pressure pipe system, a spray irrigation facility, and a recirculating sand filter. A water balance calculation, land area requirements and tabulated. (AU/SWF)

ACC# : L001430
AUTHOR: Felton, D., ed.
AFFIL : Lombardo and Associates, 90 Canal Street, Boston, MA 02114
TITLE : State-of-the Art Assessment of Compost Toilets and Greywater Treatment Systems
SOURCE: The Winthrop Rockefeller Foundation, 308 East Eighth Street, Little Rock, Arkansas 72202 (65 pages)
YEAR : 1980
TEXT : A state-of-the-art assessment is presented on composting toilets and greywater management systems. The following topics are described in separate sections: domestic waste and wastewater generation, the composting process, greywater treatment, disinfection and disposal/reuse, available technology for composting toilets and greywater systems, review of the performance for certain systems and research and demonstration needs and recommendations. A list of mailing addresses of composting toilet manufacturers is also provided. (SWF)

ACC# : L001431
AUTHOR: Lombardo, P.
AFFIL : Lombardo and Assoc., Boston, MA
TITLE : Expanding Options for Greywater Treatment
SOURCE: BioCycle, 23(3):45-49 (5 pages)
YEAR : 1982
TEXT : Discusses systems available for treatment disposal and reuse of greywater. Separate treatment of toilet wastes reduces wastewater flow by 40 percent, nitrogen by 70 percent, and phosphorous by up to 45 percent, while eliminating most potential pathogens and a large portion of biodegradable organics. Describes system design and performance for greywater systems including septic tanks, sand filters, rock filters, biological treatment, reverse osmosis, sedimentation/filtration, and physical/chemical treatment. Discusses efficiencies of chlorine, iodine, and ultraviolet disinfection. Disposal methods include soil absorption fields, land irrigation, greenhouse irrigation, recirculating showers and suds-savers. (SWF)

ACC# : L001432
AUTHOR: Englebardt, J.D.
AFFIL : Dept. of Agricultural and Chemical Engineering, Colorado State University, Fort Collins, Colorado
TITLE : Quantifications of Onsite Wastewater Treatment Operation and Maintenance
SOURCE: M.S. Thesis, Colorado State University, Fort Collins, Colorado, 1983 (141 pages)
YEAR : 1983
TEXT : From a review of both published theoretical and manufacturer's literature, as well as field surveys, a body of specific O&M recommendations has been compiled for systems which serve from one to thirty homes. An interactive computer program, developed for use on an Apple-I, accepts site-specific input data for a particular small community. It then prints O&M recommendations and calculates annual costs for the community. The most cost effective process, when O&M is considered exclusively, is the standard septic tank/leachfield system where soils and water table elevation are suitable. (AU/SWF)

ACC# : L001433

AUTHOR: Rich, L.G.
AFFIL : Environmental Systems Engineering, Clemson University, Clemson, South Carolina
TITLE : Aerated Lagoon Systems with Improved Performance
SOURCE: Public Works 114(4):35-36 (2 pages)
YEAR : 1983
TEXT : Summarizes design criteria developed in part by the Systems Engineering Department at Clemson University for the design of dual power, multicellular aerated lagoon systems. A description of the lagoon system is accompanied with a schematic. Plant performance is tabulated for package plants and aerated lagoons, and total suspended solids and BOD are compared. (SWF)

ACC# : L001434
AUTHOR: Vivona, M.A.
AFFIL : Chief Process Engineer, Bernard Johnson, Inc., Houston Texas
TITLE : Designing Plug Flow Lagoons Using Two-Stage Aeration
SOURCE: Pollution Engineering 15(3):28-32 (5 pages)
YEAR : 1983
TEXT : Discusses the use of plug flow lagoons with mechanical transfer of oxygen as a primary means of biological treatment. BOD aeration, oxygen requirements, pump requirements, lagoon spatial arrangement, lagoon circulation, and fluid momentum considerations are analyzed. Tabulated data on BOD removal and oxygen requirements as a function of length of plug flow treatment are given. Also a plug flow lagoon schematic indicating the number of pumps required at each pump column is provided. (AU/SWF)

ACC# : L001435
AUTHOR: NA
AFFIL : NA
TITLE : Onsite Domestic Sewage Disposal Handbook
SOURCE: MWPS-29, Midwest Plan Service, Iowa State University, Ames, Iowa
YEAR : 1982
TEXT : This handbook, which is available from Midwest Plan Service, Iowa State University, is designed for the homeowner who must choose an onsite sewage disposal system. The first section deals with planning, laws and regulations. The second section provides information on installation, construction and operation of the septic tank. Site selection and design for soil absorption systems are presented in the next section. Gravity and pressure distribution systems, pump selection and general descriptions of other treatment systems are also included. (SWF)

ACC# : L001436
AUTHOR: Vrale, L.
AFFIL : Norwegian Institute for Water Research, Blindern, Olso 3, Norway
TITLE : Some Aspects of Norwegian Practice
SOURCE: Alternative Wastewater Treatment, Low-Cost Small Systems, Research and Development - Proceedings of the Conference held at Olso, Norway, September 7-10, 1981 (14 pages)
YEAR : 1982
TEXT : Norwegian laws and regulations concerning water supply and wastewater treatment make it easy to use sewage problems as the most efficient tool to regulate building development. Problems observed in onsite systems are due more to incorrect construction, poor control and operation rather than the process itself. The type of problems reported are similar to those found in conventional treatment plants. Small wastewater treatment systems and onsite disposal systems must be accepted at the same level as larger and more conventional systems. More information is needed on system operation, cost, degree of removal, and degree of collection they provide in comparision to conventional systems. (AU/SWF)

ACC# : L001437
AUTHOR: Otis, R.J.
AFFIL : Dept. Civil and Environmental Engineering, University of Wisconsin, Madison, Wisconsin
TITLE : Water Movement Into and Through Soil
SOURCE: Alternative Wastewater Treatment, Low-Cost Small Systems, Research and Development - Proceedings of the Conference held at Olso, Norway, September 7-10, 1981 (12 pages)
YEAR : 1982
TEXT : Describes soil properties, including structure, texture, bulk density, clay mineralogy and their effect on water movement and wastewater purification. The gravitational and matric potentials are presented as components of the soil moisture potential. The rate of water movement is described by Darcy's Law; moisture retention curves for four different soil textures are included. Emphasizes the importance of the

clogging mat in creating unsaturated conditions necessary in septic tank absorption fields. (AU/SWF)

ACC# : L001438
AUTHOR: Otis, R.J.
AFFIL : Dept. of Civil and Environmental Engineering, University of Wisconsin, Madison
TITLE : Subsurface Soil Absorption Systems Used in the United States
SOURCE: Alternative Wastewater Treatment, Low-Cost Small Systems, Research and Development - Proceedings of the Conference held at Olso, Norway, September 7-10, 1981 (20 pages)
TEXT : An overview of trenches, beds and mounds as methods of onsite wastewater treatment and disposal is given. The geometry of the infiltrative surface and its sizing, site criteria, design consideration, and wastewater distribution for each system are analyzed. Special emphasis is given to soil permeability, unsaturated depth, depth to bedrock and the layering of the soil profile. (AU/SWF)

ACC# : L001439
AUTHOR: Kristiansen, R.
AFFIL : Agricultural Research Council of Norway, Section Soil Pollution Research, 1432 AS - NLH, Norway
TITLE : The Soil as a Renovating Medium - Clogging of Infiltrative Surfaces
SOURCE: Alternative Wastewater Treatment, Low-Cost Small Systems, Research and Development - Proceedings of the Conference held at Olso, Norway, September 7-10, 1981 (15 pages)
YEAR : 1982
TEXT : Presents an overview of research associated with the clogging layer which develops on infiltrative surfaces in septic tank leaching systems. Discusses the three clogging phases, the causes of clogging, and the effect of loading conditions, wastewater, soil type, temperature and redox conditions on clogging. Systems may be restored by resting. (AU/SWF)

ACC# : L001440
AUTHOR: Stuanes, A.O.
AFFIL : Norwegian Forest Research Institute, The Agricultural University of Norway, P.O. Box 61, 1432 As-NLH, Norway
TITLE : Phosphorus Sorption by Soil: A Review
SOURCE: Alternative Wastewater Treatment, Low-Cost Small Systems, Research and Development - Proceedings of the Conference held at Olso, Norway, September 7-10, 1981 (8 pages)
YEAR : 1982
TEXT : Soil factors affecting phosphorus sorption are discussed together with phosphate sorption isotherms and sorption mechanisms. Both soil column experiments and field studies have shown that suited soils have a high sorption capacity for phosphorus from wastewater. It is very important that a simple and accurate sorption index for phosphorus in soil and the treatment systems' operation time be found. (AU)

ACC# : L001441
AUTHOR: Laak, R.
AFFIL : Dept. Civil Engineering, University of Connecticut, Storrs, Connecticut
TITLE : On-Site Soil Systems, Nitrogen Removal
SOURCE: Alternative Wastewater Treatment, Low-Cost Small Systems, Research and Development - Proceedings of the Conference held at Olso, Norway, September 7-10, 1981 (15 pages)
YEAR : 1982
TEXT : Reviews the fate of nitrogen in septic tank and subsurface fields by ammonification, nitrification, adsorption, ammonia volatilization, biological uptake, denitrification and leachfields. Also, a passive nitrogen removal technique developed at the University of Connecticut, called the RUCK system is presented in detail. The RUCK system utilizes greywater as the organic carbon source for the denitrification step and appears to be effective in removing nitrogen from domestic wastewater. (AU/SWF)

ACC# : L001442
AUTHOR: Kristiansen, R.
AFFIL : Agricultural Research Council of Norway, Section Soil Pollution Research, 1432 As - NLH, Norway
TITLE : The Fate of Pollutants in Soil - Organic Material
SOURCE: Alternative Wastewater Treatment, Low-Cost Small Systems, Research and Development - Proceedings of the Conference held at Olso, Norway, September 7-10, 1981 (8 pages)
YEAR : 1982
TEXT : The paper links organic matter removal with the microflora living in biological filters. A figure illustrates plate counts from three

different depths in the overloaded end of a sand-filter trench loaded with 5 cm septic tank effluent per day. Stresses that soil absorption beds have confined anaerobic/aerobic zones in addition to possible anaerobic microzones in apparently aerobic soil. Discusses the effect of COD removal on trickling filters and sand filters run at varying COD loadings and temperatures. Concludes that organic matter removal is not considered a problem if loaded as recommended. (AU/SWF)

ACC# : L001443
AUTHOR: Bedient, P.B. et al
AFFIL : Dept. of Environmental Science & Engineering, Rice University, Houston, Texas
TITLE : Ground-Water Transport from Wastewater Infiltration
SOURCE: Alternative Wastewater Treatment, Low-Cost Small Systems, Research and Development - Proceedings of the Conference held at Olso, Norway, September 7-10, 1981 (9 pages)
YEAR : 1982
TEXT : Groundwater contaminant transport was investigated from a municipal wastewater infiltration system. Groundwater quality samples were collected at the Fort Devens, Massachusetts, facility from surrounding wells and were analyzed for conductivity and trace level organics contamination. Groundwater flow and chloride contaminant transport were predicted using a two-dimensional numerical simulation model. Dispersion estimates were made using organics data collected at adjacent wells and adjusted for adsorption in the porous media. Results for field dispersion compared favorably with other values reported in literature. Methods used in this field project along with modeling techniques should be applicable to other groundwater waste contaminant sites. (AU)

ACC# : L001444
AUTHOR: Haith, D.A.
AFFIL : Depts. of Agricultural Engineering and Environmental Engineering, Riley-Robb Hall, Cornell University, Ithaca, NY
TITLE : Planning Model for Land Application of Sewage Sludge
YEAR : 1983
SOURCE: The Journal of Environmental Engineering, American Society of Civil Engineers, 345 East 47th Street, New York, NY, 109(2):485-501 (9 pages)
YEAR : 1983
TEXT : Presents a mathematical model for estimating nitrate-nitrogen concentrations in percolation from sludge land application sites. The model is based on annual mass balances of sludge and soil inorganic nitrogen and includes the processes of mineralization, ammonia volatilization, crop uptake and leaching. Field tests measuring nitrate-nitrogen concentration in skim samples taken from the water table surface in monitoring wells compared favorably with predicted values. (AU/SWF)

ACC# : L001445
AUTHOR: Boyle, W.C., Siegrist, R.I., Anderson, D.L.
AFFIL : Dept. of Civil & Environmental Engineering, University of Wisconsin, Madison, Wisconsin
TITLE : Alteration of In House Wastewater Flow with Low Flush Toilet Fixtures and Greywater Recycle
SOURCE: Alternative Wastewater Treatment, Low-Cost Small Systems, Research and Development - Proceedings of the Conference held at Olso, Norway, September 7-10, 1981 (19 pages)
YEAR : 1982
TEXT : Evaluates the performance of extreme low-flush toilet fixtures and greywater recycle systems. Provides tables of physical-chemical water quality, water use and wasteflow characteristics. Discusses the effects of these systems on water use and waste flow, installation, operation and maintenance, user acceptance and costs. (SWF)

ACC# : L001446
AUTHOR: Boyle, W.C., Siegrist, R.L., Saw, C.C.
AFFIL : Dept. of Civil & Environmental Engineering, University of Wisconsin, Madison, Wisconsin
TITLE : Treatment of Residential Greywater with Intermittent Sand Filtration
SOURCE: Alternative Wastewater Treatment, Low-Cost Small Systems, Research and Development - Proceedings of the Conference held at Olso, Norway, September 7-10, 1981 (24 pages)
YEAR : 1982
TEXT : Discusses field research evaluating greywater characteristics and the performance of a septic tank/intermittent sand filter system as a means of reclaiming greywater for effluent disposal or reuse. Residential greywater, especially kitchen sink wastewater, contains substantial amounts of pollutants, including BOD-5, suspended solids, nitrogen and phosphorus. The septic tank intermittent sand filter system treated

greywater effectively; however, it did not offer a substantial improvement in cost savings, effluent quality or manageability over a similar system for total residential waste. (AU/SWF)

ACC# : L001447
AUTHOR: Kristiansen, R.
AFFIL : Agricultural Research Council of Norway, Section Soil Pollution Research, 1432 As - NLH, Norway
TITLE : Research on On-Site Disposal Methods in Norway - Past and Present
SOURCE: Alternative Wastewater Treatment, Low-Cost Small Systems, Research and Development - Proceedings of the Conference held at Olso, Norway, September 7-10, 1981 (5 pages)
YEAR : 1982
TEXT : Outlines Norwegian projects of a joint research program directed toward site selection, clogging of infiltration surfaces and renovating processes in soil absorption systems. Research institutions and aim of specific projects are provided. (AU/SWF)

ACC# : L001448
AUTHOR: Enfield, C.G.
AFFIL : U.S. EPA, Robert S. Kerr Environmental Research Laboratory, Ada, Oklahoma
TITLE : Modeling Phosphorus Sorption and Movement in Soils in Relation to Septic Tank Leach Fields
SOURCE: Alternative Wastewater Treatment, Low-Cost Small Systems, Research and Development - Proceedings of the Conference held at Olso, Norway, September 7-10, 1981 (16 pages)
YEAR : 1982
TEXT : Presents models which project the concentration of phosphorus in solutions within a dynamic well-water system. Models include chemical stability, sorption-desorption, kinetics and transport. Further studies are needed to assess the affect of temperature, pH, and retardation coefficient on the projections. (AU/SWF)

ACC# : L001449
AUTHOR: Stenstrom, T.A., Hoffner, S.
AFFIL : The National Bacteriological Laboratory, Dept. of Water Microbiology, S-105 21 Stockholm, Sweden
TITLE : Reduction of Enteric Microorganisms in Soil Infiltration Systems
SOURCE: Alternative Wastewater Treatment, Low-Cost Small Systems, Research and Development - Proceedings of the Conference held at Olso, Norway, September 7-10, 1981 (13 pages)
YEAR : 1982
TEXT : The reduction of fecal microorganisms including many pathogenic viruses and bacteria in a soil infiltration unit will depend on interaction of various factors. Soil characteristics, composition of the infiltrated water and characteristics of the microorganism itself are all of great importance. This paper deals with some of the factors of importance for microbial survival and transportation in a soil infiltration unit. The purpose is to increase the knowledge and understanding of these factors and their complex interactions. This could be of great practical value when constructing onsite wastewater treatment systems. (AU)

ACC# : L001450
AUTHOR: Brain, L.
AFFIL : Norwegian State Pollution Control Authority (SFT), Olso, Norway
TITLE : Present Norwegian Practice and Activities for Improvement of On-Site Wastewater Disposal
SOURCE: Alternative Wastewater Treatment, Low-Cost Small Systems, Research and Development - Proceedings of the Conference held at Olso, Norway, September 7-10, 1981 (11 pages)
YEAR : 1982
TEXT : A brief summary of Norwegian regulations and guidelines concerning onsite wastewater disposal outlines current research to improve wastewater treatment and disposal in unsewered areas. Diagram of alternative systems for small flows are provided. (AU/SWF)

ACC# : L001451
AUTHOR: Harr, C.
AFFIL : Engineering and Contracting Company, Olso, Norway
TITLE : Present Technology in Northern Europe on Wastewater Treatment Plants for Small Flows
SOURCE: Alternative Wastewater Treatment, Low-Cost Small Systems, Research and Development - Proceedings of the Conference held at Olso, Norway, September 7-10, 1981 (19 pages)
YEAR : 1982
TEXT : Discusses the results of a survey of wastewater treatment plants for small flows (less than 50 persons) on the Norwegian market. These

systems include biodiscs, biofilters, activated sludge and chemical treatment. Provides a brief description of each system, along with operation and performance data. (AU/SWF)

ACC# : L001452
AUTHOR: Skaarer, N.
AFFIL : Dept. of Landscape Architecture, Agricultural University of Norway, As, Norway
TITLE : Practical Experiences with Alternative Systems for Problem Soils in Norway
SOURCE: Alternative Wastewater Treatment, Low-Cost Small Systems, Research and Development - Proceedings of the Conference held at Olso, Norway, September 7-10, 1981 (10 pages)
YEAR : 1982
TEXT : Provides background information pertinent to the low energy housing project experiment undertaken by the Agricultural University of Norway. The project which is comprised of 10 test houses and 35 people, local infiltration systems built and tested include shallow trenches supplemented with storage tanks and a mound system. Design schematics, operating experience, and cost considerations for each system are presented. (AU/SWF)

ACC# : L001453
AUTHOR: Molland, O.
AFFIL : Soil Pollution Research, The Agricultural Research Council of Norway, 1432 As - NLH, Norway
TITLE : Norway Introduced Quality Standards for Biological Toilets
SOURCE: Alternative Wastewater Treatment, Low-Cost Small Systems, Research and Development - Proceedings of the Conference held at Olso, Norway, September 7-10, 1981 (10 pages)
YEAR : 1982
TEXT : The Agricultural Research Council of Norway presents the biological toilet as a viable sewerless onsite system alternative. A description of the toilet and its advantages and disadvantages are presented with a figure depicting basic design features. The Norwegian State Pollution Control Agency introduced a functional tests for approval of biological toilets which include evaluation of the performance of the system under standarized conditions, adequate installation instructions, care and maintenance procedures, adequate capacity, odor control and materials and construction. (AU/SWF)

ACC# : L001454
AUTHOR: von Bromssen-U
AFFIL : The National Swedish Environment Protection Board, the Research Dept. (SNV - Ff), Box 1302 171 25 Solna, Sweden
TITLE : Research on On-Site Disposal Methods in Sweden - Past and Present
SOURCE: Alternative Wastewater Treatment, Low-Cost Small Systems, Research and Development - Proceedings of the Conference held at Olso, Norway, September 7-10, 1981 (12 pages)
YEAR : 1982
TEXT : Describes research projects in Sweden which deal with the fundamental processes of the soil, design and management of sub-soil systems, uncontrolled infiltration and groundwater pollution control. Postal addresses of researchers are provided. All projects are financed through the National Swedish Environment Protection Board (SNV) within the Infiltration Project. (AU/SWF)

ACC# : L001455
AUTHOR: Otis, R.J.
AFFIL : Dept. of Civil & Environmental Engineering, University of Wisconsin, Madison, Wisconsin
TITLE : Evaluation of Site Suitability for Subsurface Soil Absorption of Wastewater
SOURCE: Alternative Wastewater Treatment, Low-Cost Small Systems, Research and Development - Proceedings of the Conference held at Olso, Norway, September 7-10, 1981 (15 pages)
YEAR : 1982
TEXT : Consideration necessary for proper subsurface soil absorption of wastewater includes preliminary site evaluation, field testing, visual surveys, soil borings, hydraulic conductivity and hydrogeologic investigations. Properties of mineral soils, hydraulic characteristics of different soil textures, and the feasibility of different onsite disposal methods under various site conditions are tabulated. (AU/SWF)

ACC# : L001456
AUTHOR: Jenssen, P.O.
AFFIL : Agricultural Research Council of Norway, The Agricultural University of Norway, 1432 As - NLH, Norway

TITLE : Selection of Disposal Sites in Norway
SOURCE: Alternative Wastewater Treatment, Low-Cost Small Systems, Research and Development - Proceedings of the Conference held at Olso, Norway, September 7-10, 1981 (15 pages)
YEAR : 1982
TEXT : Describes current onsite disposal problems encountered in Norway: inadequate codes and guidelines, thin and dispersed soils, and a lack of skilled people to perform the necessary investigation. New codes will emphasize soil hydraulic properties. Equipment which makes the percolation test more accurate and an improved method for in-situ measurement of hydraulic conductivity are described. (AU/SWF)

ACC# : L001457
AUTHOR: Wilson, S.A., Ronayne, M.P., Paeth, R.C.
AFFIL : Oregon Dept. of Environmental Quality
TITLE : Characteristics of Residential and Industrial Septic Tank Effluents: Chapter 15
SOURCE: Oregon On-Site Experimental Systems Program - Final Report, December 1982 (7 pages)
YEAR : 1982
TEXT : An Oregon study was undertaken to determine the quality of eight residential and two industrial effluents treated by double- and single-compartment septic tanks. Effluent was characterized for average daily flow, BOD, nitrite, nitrate, ammonia, TKN, total nitrogen, and fecal coliform and suspended solids; results are tabulated. (AU/SWF)

ACC# : L001458
AUTHOR: Wilson, S.A., Ronayne, M.P., Paeth, R.C.
AFFIL : Oregon Dept. of Environmental Quality
TITLE : Mound Systems: Chapter 12
SOURCE: Oregon On-Site Experimental Systems Program - Final Report, December 1982 (17 pages)
YEAR : 1982
TEXT : Four Oregon mound systems treating septic tank effluent from dosing tanks and a pressure distribution system are analyzed. Mound design criteria, mound pressurized distribution system construction details, actual mound hydraulic loadings, mound absorption system details, mound water quality monitoring data, and a description of site conditions and mound performance are tabulated. (AU/SWF)

ACC# : L001459
AUTHOR: Zaim, M.; Newson, H.D.
AFFIL : Departments of Entomology, Microbiology, and Public Health, Michigan State University
TITLE : Effects of Wastewater Spray Irrigation on Indigenous Mosquito Populations
SOURCE: Entomological Society of America, 9(5):563-566 (4 pages)
YEAR : 1980
TEXT : Four consecutive years of municipal sewage disposal by spray irrigation produced marked changes in the population and species composition of the mosquitoes present in an experimental water quality management project. Observations to this time clearly indicate that the disposal of sewage effluent by spray irrigation creates a diversity of excellent mosquito breeding habitats and the resulting increases in the populations and species diversities enhance the potential for pest and disease transmission problems in the vicinity of this and other similar sewage disposal projects. (AU)

ACC# : L001460
AUTHOR: Domin, V.
AFFIL : Underwriting Manager, Home Owners Warranty Corporation
TITLE : Home Owner Warranty (HOW) Program
SOURCE: Individual Onsite Wastewater Systems - Proceedings of the Eighth National Conference, 1981, Ann Arbor Science Publishers, Inc., Ann Arbor, Michigan (5 pages)
YEAR : 1981
TEXT : The home owners warranty (HOW) program, established by the National Association of Home Builders, provides 10 years of new home warranty and insurance protection. The HOW program involvement with onsite wastewater treatment systems is limited to well and septic systems and/or municipal water and sewer service to single family homes and low-rise condominiums. These systems must comply with HOW approved standards to merit warranty and insurance coverage. Home builders offering the HOW program guarantee to correct defects involving the onsite systems for one year after construction. In the second year, only the wiring and piping associated with the system are covered by the builder's warranty. The HOW corporation guarantees repairs to the wastewater treatment system if the builder fails to honor the warranty during the first two years after construction. (SWF)

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ACC#  : L001461
AUTHOR: Liu, L.
AFFIL : Environmental Contaminants Division, Natural Water Research Institute,
        Burlington, Canada  L7R 4A6
TITLE : The Effect of Sewage Sludge Land Disposal on the Microbiological Quality
        of Groundwater
SOURCE: Water Research, 16(6):957-961 (5 pages)
TEXT  : The long-term effect of farmland disposal of anaerobically digested
        sewage sludges (alum, iron and lime) on the microbiological quality of
        groundwater was investigated using the lysimeter system.  Sludge was
        applied heavily for four years.  Observations after the fourth year
        indicate that 92-93 percent of the sewage microorganisms in the sludge
        had perished in the soil systems.  Analyses of leachates and soils for
        coliforms and heterotrophic bacterial populations revealed that there
        was little possibility of microbiological contamination of groundwater
        by the practice of sludge farmland disposal, provided the groundwater
        table was not too high and the soil was well-drained.  (AU)

ACC#  : L001462
AUTHOR: White, R.K.
AFFIL : Extension Agricultural Engineer, Ohio State University
TITLE : Select the Right Land Application System for Your Needs
SOURCE: BioCycle, Journal of Waste Recycling, 23(2):24-27 (4 pages)
YEAR  : 1982
TEXT  : The components of a system for applying sludge to farmland are (1)
        storage or alternative disposal; (2) sludge hauling; and, (3) field
        application.  Options available for each of these stages are reviewed in
        terms of both the city's and the farmer's objectives.  A cost analysis
        shows the type of system which is most cost-effective for different
        scale operations.  (SWF)

ACC#  : L001463
AUTHOR: Wilson, S.A.; Ronayne, M.P.; Paeth, R.C.
AFFIL : Oregon Dept. of Environmental Quality
TITLE : Gray Water:  Chapter 13
SOURCE: Oregon On-Site Experimental Systems Program - Final Report, Oregon Dept.
        of Environmental Quality (14 pages)
YEAR  : 1982
TEXT  : Evaluates a 198-gal. septic tank, 55-gal. pea-gravel filter, 132-gal.
        trickle rock filter, and a small recirculating sand filter preceded by a
        750-gal. septic tank for treatment of greywater.  Performance was
        variable in the pea-gravel filter and the trickle rock filter due to
        lack of surge protection.  The recirculating sand filter produced the
        highest quality effluent of all the greywater treatment systems.
        Greywater treatment systems did not eliminate the necessity for
        subsurface disposal fields.  The most economical and practical method
        for greywater disposal was a standard septic tank with a reduced-size
        disposal field.  (AU/SWF)

ACC#  : L001464
AUTHOR: Wilson, S.A.; Ronayne, M.P.; Paeth, R.C.
AFFIL : Oregon Dept. of Environmental Quality
TITLE : Composting Toilets:  Chapter 14
SOURCE: Oregon On-Site Experimental Systems Program - Final Report, Oregon Dept.
        of Environmental Quality (9 pages)
YEAR  : 1982
TEXT  : Provides four progress reports on 28 composting toilets
        installed in houses under the Experimental On-site Program.  Many toilet
        users had difficulty learning how to use and maintain these units
        properly.  Some users were pleased with their composting toilet but many
        were not.  Many complained of solid and liquid waste buildup, odors, and
        flies.  Six users removed their units and replaced them with
        conventional toilets because of these problems.  (AU/SWF)

ACC#  : L001465
AUTHOR: Basiouny, F.M.
AFFIL : Department of Agricultural Sciences, Tuskegee Institute, Alabama
TITLE : Wastewater Irrigation of Fruit Trees
SOURCE: BioCycle, Journal of Waste Recycling, 23(2):51-53 (3 pages)
YEAR  : 1982
TEXT  : The irrigation of fruit trees with treated sewage effluent supplies
        nutrients needed for growth in amounts similar to commercial fertilizer
        preparations.  Production costs involving fertilizer, machinery and
        labor can be reduced 25-to 30-percent by effluent application.
        Additional benefits of this method of effluent disposal are the
        reduction of the pollution load on surface waters and groundwater
        recharge.  The presence of high levels of heavy metals and pathogenic
        organisms in the effluent, which could be detrimental to both fruit
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trees and humans, can be reduced through proper treatment procedures prior to use in orchard irrigation. (SWF)

ACC# : L001466
AUTHOR: Wilson, S.A.; Ronayne, M.P.; Paeth, R.C.
AFFIL : Oregon Dept. of Environmental Quality
TITLE : Pressure Distribution Systems in Soils with Shallow Groundwater: Chapter 9
SOURCE: Oregon On-Site Experimental Systems Program - Final Report, Oregon Dept. of Environmental Quality, (7 pages),
YEAR : 1982
TEXT : The objective of the Oregon study was to test several vertical separation distances between the bottom of disposal trenches and groundwater where pressure distribution systems were installed. The impact of effluent on groundwater quality was monitored and assessed. Proper sizing, design, and overall performance of low pressure distribution systems are characterized. Includes a discussion of pressurized effluent disposal in soils of varying texture and characteristics. (AU/SWF)

ACC# : L001467
AUTHOR: Wilson, S.A.; Ronayne, M.P.; Paeth, R.C.
AFFIL : Oregon Dept. of Environmental Quality
TITLE : Evapotranspiration Absorption Systems: Chapter 11
SOURCE: Oregon On-Site Experimental Systems Programs - Final Report, Oregon Dept. of Environmental Quality (9 pages)
YEAR : 1982
TEXT : Evapotranspiration-absorption (ETA) beds were installed at selected Oregon sites to determine if the combination of soil absorption and evapotranspiration would overcome the limitation of slow and very slow permeability and allow an onsite treatment and disposal system to function properly. Design methods and a discussion of results are included. Concludes that properly designed and constructed beds functioned satisfactorily in suitable soils in areas where annual precipitation is 25 inches (625 mm) or less; somewhat poorly drained soils were not suitable for installation of ETA systems. ETA beds functioned almost entirely as soil absorption beds with little or no evapotranspiration. (AU/SWF)

ACC# : L001468
AUTHOR: Wilson, S.A.; Ronayne, M.P.; Paeth, R.C.
AFFIL : Oregon Dept. of Environmental Quality
TITLE : Evapotranspiration Systems: Chapter 10
SOURCE: Oregon On-Site Experimental Systems Program - Final Report, Oregon Dept. of Environmental Quality (8 pages)
YEAR : 1982
TEXT : This study was undertaken to determine if evapotranspiration beds could be used to dispose of wastewater in soils with poor drainage. Sixteen beds were installed in two counties. Concludes that a 4-mil plastic liner allowed untreated effluent to leak from all of the beds in the soil system. The beds were too small to function safely on evapotranspiration. Bed size would have to be increased about three times to function successfully in Oregon. (AU/SWF)

ACC# : L001469
AUTHOR: Wilson, S.A.; Ronayne, M.P.; Paeth, R.C.
AFFIL : Oregon Dept. of Environmental Quality
TITLE : Subsurface System Cost: Chapter 16
SOURCE: Oregon On-Site Experimental Systems Program - Final Report, Oregon Dept., of Environmental Quality (6 pages)
YEAR : 1982
TEXT : The construction and the operation and maintenance costs of the standard septic tank-absorption field are compared to alternative systems, including sand filters, tile dewatering, seepage trench, steep slope, saprolite, pressure distribution, evapotranspiration, evapotranspiration-absorption, mound, composting toilet, and greywater separation. A chart delineating site constraints for Oregon onsite subsurface systems is presented. Concludes that the standard system is the most cost-effective and trouble-free system where suitable soils occur. (AU/SWF)

ACC# : L001470
AUTHOR: Wilson, S.A.; Ronayne, M.P.; Paeth, R.C.
AFFIL : Oregon Dept. of Environmental Quality
TITLE : Intermittent Sand Filter Systems: Chapter 3
SOURCE: Oregon On-Site Experimental Systems Program - Final Report, Oregon Dept. of Environmental Quality (24 pages)
YEAR : 1982

TEXT : Intermittent sand filters were installed at seven Oregon sites to determine if sand filter treatment of septic tank effluent would produce adequate treatment in soils with poor drainage. Design methods, monitoring, and a discussion of results are included. Intermittent sand filters required no maintainance during the monitoring period. BOD, suspended solids, and total nitrogen were reduced 98, 93, and 49 percent respectively. All soil absorption systems functioned properly; biomat formation was not a problem and soil absorption rates following the sand filter were considerably higher than those commonly reported for septic tank effluent. (AU/SWF)

ACC# : L001471
AUTHOR: Wilson, S.A.; Ronayne, M.P.; Paeth, R.C.
AFFIL : Oregon Dept. of Environmental Quality
TITLE : Recirculating Sand Filter Systems: Chapter 2
SOURCE: Oregon On-Site Experimental Systems Program - Final Report, Oregon Dept. of Environmental Quality (19 pages)
YEAR : 1982
TEXT : Recirculating sand filters were installed at three Oregon sites to determine if sand filter treatment of septic tank effluent was adequate to prevent surface failures and groundwater contamination from final disposal in a standard disposal field. Design methods, monitoring, and a discussion of results are included. Concludes that the surfaces of recirculating sand filters were subject to an accumulation of leaves, other fallen debris, and vegetation growth which tended to clog the effluent distribution system; however, there was no measurable impact on treatment. BOD, suspended solids, and total nitrogen were reduced by 99, 97 and 45 percent, respectively. Total and fecal coliforms were reduced by two logarithms. Sand filtration of septic tank effluent significantly increased the effluent acceptance rate of the disposal trenches. (AU/SWF)

ACC# : L001472
AUTHOR: Muthuswamy, S.; Basha, C.J.; Govindan, V.S.; Sundaresan, B.B.
AFFIL : Public Health Engineering Department, College of Engineering, Guindy, Madras, Andhra Pradesh Public Works Department and National Environmental Engineering Research Institute, Nagpur, India
TITLE : Fish Polyculture in Sewage Effluent Ponds
SOURCE: Indian Journal of Environmental Health, 20(3):219-231 (13 pages)
YEAR : 1978

TEXT : Three oxidation ponds inside the sewage treatment demonstration plant at the College of Engineering, Madras, India, have been connected in series to treat 1,800,000 l/day (400,000 gpd) of sewage. These ponds were assessed for their effectiveness to stabilize organic matter and reduce pollution. The growth pattern and the yield of fish have been determined in a polyculture system using "Labeo fimbriatus", "Labeo rohita", "Cirrhina mrigala", and "Cyprinus carpio". The rate of fish production in the II and III series ponds was computed as 11,545 kg/ha/year. An attempt has been made to correlate algal and fish biomass production. (AU)

ACC# : L001473
AUTHOR: Guo, P.H.M.; Thirumurthi, D.; Jank, B.E.
AFFIL : World Health Organization, Seoul, Republic of Korea, Civil Engineering, Nova Scotia Technical College, Halifax, N.S.; and, Biological Processes Section, WTC, Burlington, Ontario
TITLE : Evaluation of Extended Aeration Activated Sludge Package Plants
SOURCE: Journal Water Pollution Control Federation, 53(1):33-42 (10 pages)
YEAR : 1981
TEXT : Twenty extended aeration package plants were studied to evaluate their performance, identify the extent and cause of operational problems, and determine associated costs. Results were compared with performance data from National Sanitation Foundation (NSF) tests on similar plants observed under optimum conditions. More than half of the plants tested failed to meet the official effluent standards reported by NSF (14 mg/l BOD-5 and 19 mg/l suspended solids). Problems were grouped into three areas: process, equipment, and operator-oriented failures. The major cause of poor performance was operator failure in O&M due to lack of personnel or insufficient training. A correlation was found between design capacity and equipment cost, but no relationship could be identified between design capacity and O&M cost. A minimum of 400 hours/year for O&M was recommended. (SWF)

ACC# : L001474
AUTHOR: Bouwer, H.; Lance, J.C.; Gilbert, R.G.; Rice, R.C.
AFFIL : U.S. Water Conservation Laboratory, Phoenix, Arizona
TITLE : Rapid-infiltration Research at Flushing Meadows Project, Arizona
SOURCE: Journal Water Pollution Control Federation, 52(10):2457-2470 (14 pages)

YEAR : 1980
TEXT : A ten-year research project in Arizona examined the effectiveness of a rapid-infiltration system to renovate secondary wastewater effluent. Secondarily treated effluent was pumped into six sand-gravel basins (6.1 by 213 m) to a depth of 30 cm during intermittent periods. Hydraulic loading effects on effluent quality, organics, inorganics, heavy metals removal, and microbiological characteristics were investigated. The average maximum hydraulic loading rate of 122 m/yr was obtained with flooding periods of two to three weeks alternating with drying periods of 10 days in summer and 20 days in winter. Effluent nitrogen removal was maximized by reducing the loading rate and water depth to 60 m/yr and 15 cm, respectively. Phosphorus and fluoride removal increased as a function of underground wastewater movement. Effluent concentrations of heavy metals, excluding lead, were below maximum levels for potability. Maximum levels for irrigation utilization, including lead, were also below maximum levels. Viruses were effectively removed during infiltration through the sand-gravel basins. Fecal coliforms were detected in water sampled under the basins but could not be detected in renovated water samples 90 m from the basins. Results from this project showed that rapid infiltration of secondary wastewater effluent through the sand-gravel basins produced renovated water suitable for irrigation, and recreation and consumption following any necessary chlorination. (SWF)

ACC# : L001475
AUTHOR: Duda, A.M.; Cromartie, K.D.
AFFIL : Water Quality Branch, North Carolina Division of Environmental Management
TITLE : Coastal Pollution from Septic Tank Drainfields
SOURCE: Journal of the Environmental Engineering Division, 108(EE6):1265-1279 (8 pages)
YEAR : 1982
TEXT : Wet weather and dry weather sampling is utilized to monitor densities of coliform bacteria in waters draining residential areas of coastal North Carolina. The bacterial levels are compared to different densities of unsewered residences in each watershed and the limitations of the developed soils for assimilating septic tank effluent. An analysis of the data implicates septic tank drainfields installed in unsuitable soils as a major source of contamination of these shellfish waters. In order to reduce the threat to public health and the multimillion dollar economic loss to the fishing industry several options are presented for rehabilitating concentrations of failing septic tank systems and for modifying failing drainage systems that carry the contamination directly to shellfish waters. In addition, several common sense management practices that minimize the delivery of bacterial contamination to estuarine waters are suggested for use in siting future coastal residential development. (AU)

ACC# : L001476
AUTHOR: Airvac
AFFIL : Airvac, P.O. Box 508, Rochester, Indiana
TITLE : Airvac Vacuum Sewerage System Design Manual
SOURCE: Airvac, P.O. Box 508, Rochester, Indiana
YEAR : 1983
TEXT : A description of vacuum sewerage systems emphasizes the application, design, installation, maintenance, and equipment specifications of the proprietary AIRVAC system. Includes a design example. (SWF)

ACC# : L001477
AUTHOR: Wilson, S.A.; Ronayne, M.P.; Paeth, R.C.
AFFIL : Oregon Department of Environmental Quality
TITLE : Oregon Administrative Rules
SOURCE: Oregon On-Site Experimental Systems Program - Final Report, Oregon Department of Environmental Quality (37 pages)
YEAR : 1982
TEXT : Provides a list of Oregon's administrative rules on experimental and onsite sewage disposal systems. Includes site selection criteria. The rules are mandated by the Oregon Department of Environmental Quality. (SWF)

ACC# : L001478
AUTHOR: Brinley, R.K.; Olmstead, R.D.; Wilkinson, S.M.
AFFIL : Peabody Barnes, Inc., 651 North Main Street, Mansfield, Ohio
TITLE : Design Manual for Pressure Sewer Systems
SOURCE: Peabody Barnes, Inc., 651 North Main Street, Mansfield, Ohio (109 pages)
YEAR : 1982
TEXT : The design manual provides technical information concerning pressure sewer system technology. Information outlined includes the definition,

history applications, advantages, disadvantages, design and operation, and maintenance of pressure sewer systems. The design section contains four different methods of design with necessary tables, graphs, and examples. Provides specifications for both grinder and effluent pumps. (SWF)

ACC# : L001479
AUTHOR: Wilson, S.A.; Ronayne, M.P.; Paeth, R.C.
AFFIL : Oregon Department of Environmental Quality
TITLE : Recirculating Sand Filter Systems
SOURCE: Oregon Onsite Environmental Program - Final Report, Oregon Dept. of Environmental Quality (52 pages)
YEAR : 1982
TEXT : Reports on intermittent-recirculating sand filter treatment of septic tank effluent prior to discharge into disposal trenches installed either in soils shallow to hardpans, claypans, saprolite, bedrock, and groundwater, or in soils with permeability rates either too rapid for adequate treatment or too slow for adequate disposal. Tables include data on operation and maintenance needs and effluent characteristics. Sand filtration of septic tank effluent increased disposal trench acceptance rates. (AU/SWF)

ACC# : L001480
AUTHOR: Mitchell, D.
AFFIL : Arkansas Onsite Domestic Wastewater Renovation Project, University of Arkansas, Fayetteville, Arkansas
TITLE : Nonuniform Distribution by Septic Tank Systems
SOURCE: Arkansas Onsite Domestic Wastewater Renovation Project, University of Arkansas, Fayetteville, Arkansas (11 pages)
YEAR : 1983
TEXT : A study of flow distribution in distribution boxes and the field laterals indicates that presently installed septic tank lateral fields cannot give uniform distribution of the liquid. Without a dosing device, uniform distribution by septic tank dosing boxes cannot be achieved. Even with dosing, uniform distribution in the lateral lines cannot be achieved using commercially available four inch diameter pipe. Reasonably good distribution of effluent is reported with 1/8-inch and 3/32-inch holes, in one- and two- inch pipe placed on a two percent grade. (AU/SWF)

ACC# : L001481
AUTHOR: U.S. EPA
AFFIL : Office of Water Program Operations, Environmental Protection Agency, Washington, DC
TITLE : Package Treatment Plants
SOURCE: Office of Water Program Operations, Environmental Protection Agency, Washington, DC (53 pages)
YEAR : 1977
TEXT : The manual is directed to the package wastewater treatment plant operator, owner, and design engineer as a reference for operation and maintenance. Part 1 sets up guidelines utilized in daily operation of package treatment plants. Included are daily observations, tests and interpretations, troubleshooting, and an initial and final survey of the plant. Part 2 lists and illustrates how a treatment plant works. Part 3 includes information helpful to the operator but may not necessarily be a part of day-to-day observations. Included are case histories and safety and emergency precautions. (AU/SWF)

ACC# : L001482
AUTHOR: Morris-GA
AFFIL : Environmental Health Services, Waukesha County Department of Health, 515 W. Moreland Blvd., Room G-73, Waukesha, Wisconsin
TITLE : Alternate Mound Systems in Waukesha County, Wisconsin
SOURCE: Journal of Environmental Health, 44(5):260 (1 page)
YEAR : 1982
TEXT : The use of alternate mound systems is discussed as a successful alternative to sewage disposal in overcoming seasonal and saturated high groundwater conditions in Wisconsin. Waukesha County entered into an experimental mound program whereby mound systems were installed and surveyed annually. Problems associated with the mound systems are discussed. At the close of the study, no alternate mound system was found to be failing. (AU/SWF)

ACC# : L001483
AUTHOR: Dennis Weeter Associates, Inc.
AFFIL : Dennis Weeter Associates, Inc., Rt. 4, Box 283, Louisville, Tennessee
TITLE : A Feasibility Study of an an On-Lot Wastewater Management System
SOURCE: Dennis Weeter Associates, Inc., Rt. 4, Box 283, Louisville, Tennessee

(24 pages)
YEAR : 1983
TEXT : A draft feasibility study addresses the implementation of an on-lot wastewater management system in lieu of a conventional sewer project. The study gives details of an implementation scenario, examines several financing options, and outlines management and regulatory needs. (AU/SWF)

ACC# : L001484
AUTHOR: Nichols, D.S.; Boelter, D.H.
AFFIL : USDA Forest Service, Forestry Science Lab., Grand Rapids, Michigan, and Pacific Northwest Station, Corvallis, Oregon
TITLE : Treatment of Secondary Sewage Effluent with a Peat-Sand Filter Bed
SOURCE: Journal of Environmental Quality, 11(1):86-92 (6 pages)
YEAR : 1982
TEXT : A peat-sand filter bed provides additional treatment of secondary sewage effluent from a campground. The filter consists of a top layer of hemic, reed-sedge peat, followed by a layer of sand and peat mixed together, a sand layer, and finally a gravel layer. The base of the filter contains PVC pipe for leachate collection. The peat-sand filter bed accomplishes almost complete removal of fecal coliform and phosphorus. Removal of nitrogen was high in the first few years, but declined later due to oxidation of the peat and release of nitrogen. Several factors which contributed to nitrogen and phosphorus removal are: high iron, aluminum, and ash content of the peat; microbial immobilization of the peat; and rough-stalked bluegrass planted on the peat surface. (AU/SWF)

ACC# : L001485
AUTHOR: National Sanitation Foundation
AFFIL : National Sanitation Foundation, 3475 Plymouth Road, P.C. Box 1468, Ann Arbor, Michigan
TITLE : Performance Criteria and Standard Performance Evaluation Method for Extended Aeration Type Package Sewage Treatment Plants
SOURCE: National Sanitation Foundation, 3475 Plymouth Road, P.C. Box 1468, Ann Arbor, Michigan (22 pages)
YEAR : 1981
TEXT : This document presents the National Sanitation Foundation Basic Criteria C-9: Aeration Type Package Plant Performance Criteria and Standard Performance Evaluation Method. It includes a description of the following: 1) the requirements which must be met by the manufacturer to qualify for performance evaluation; 2) the general test conditions and reporting procedures to be used in the evaluation; 3) the criteria to be used in evaluating startup performance, the commercial flow pattern performance, and the residential flow pattern performance tests; 4) the flow pattern change and solids adjustment period to occur after the commercial flow pattern test; 5) the effluent requirements for the commercial and residential flow pattern tests; and 6) allowable the deviation from the provisions of the Standard Methods for the Examination of Water and Wastewater. (AU/SWF)

ACC# : L001486
AUTHOR: National Sanitation Foundation
AFFIL : National Sanitation Foundation, 3475 Plymouth Road, P.O. Box 1468, Ann Arbor, Michigan
TITLE : Package Plant Criteria Development-Part I: Extended Aeration
SOURCE: National Sanitation Foundation, 3475 Plymouth Road, P.O. Box 1468, Ann Arbor, Michigan (55 pages)
YEAR : 1966
TEXT : Summarizes the National Sanitation Foundation research which was conducted to establish criteria by which the performance of extended aeration treatment could be evaluated. The Standard Performance Evaluation Method is based on the Performance Criteria which are also presented in the report. Also included are details on test equipment, research site layout, and laboratory procedures. (AU/SWF)

ACC# : L001487
AUTHOR: National Sanitation Foundation
AFFIL : National Sanitation Foundation, 3475 Plymouth Road, P.C. Box 1468, Ann Arbor, Michigan
TITLE : Package Sewage Treatment Plant Criteria Development-Part II: Contact Stabilization
SOURCE: National Sanitation Foundation, 3475 Plymouth Road, P.O. Box 1468, Ann Arbor, Michigan (28 pages)
YEAR : 1968
TEXT : The report contains performance criteria for contact stabilization type package sewage treatment plants. Operation of four contact stabilization plants indicate that this process can satisfactorily remove the major portion of both suspended solids and BCD in domestic

wastewater without an odor or noise nuisance in the surrounding area. Performance of contact stabilization plants on BOD and suspended solids removal of varying wastes is defined. Includes a tabulation of seasonal effects on organic, nitrogen, and phosphorus removal under steady state and variable flow patterns. (AU/SWF)

ACC# : L001488
AUTHOR: Weigand, R.G.
AFFIL : Mid-Ohio Valley Health Dept., 211 6th Street, Parkersburg, West Virginia
TITLE : A Comprehensive Program for Surveillance of Package Plants and Stabilization Ponds
SOURCE: Mid-Ohio Valley Health Dept., 211 6th Street, Parkersburg, West Virginia (16 pages)
TEXT : This report, which describes a county-wide surveillance program for package plants and stabilization ponds, covers the following five areas: 1) site and plan review, 2) construction inspection, 3) operation training, 4) routine operation and maintenance inspection, and 5) enforcement. An overview of the facilities participating in the program is provided. (SWF)

ACC# : L001489
AUTHOR: Sutherland, J.C.
AFFIL : Williams & Works, Grand Rapids, Michigan
TITLE : Michigan Wetland Wastewater Tertiary Treatment Systems
SOURCE: Water Reuse, Ann Arbor Science Publishers, Ann Arbor, Michigan (10 pages)
YEAR : 1982
TEXT : Wetlands provide wastewater treatment benefits for wildlife that are not available with conventional land treatment. Artificial wetlands may be suitable as a sanctuary and conservancy for certain sensitive or threatened plant species. The wetland soil surface remains open, allowing seepage without maintenance. The costs associated with wetland construction are lower than for upland spray irrigation systems and are comparable to those for flood irrigation. Two communities are used to illustrate these benefits. (SWF)

ACC# : L001490
AUTHOR: Wilson, S.A.; Ronayne, M.P.; Paeth, R.C.
AFFIL : Oregon Dept. of Environmental Quality
TITLE : Disposal Trenches in Soils with Slow and Very Slow Permeabilities, On Steep Slopes, and on Shallow Soils Over Weathered and Fractured Bedrock
SOURCE: Oregon On-site Experimental Systems Program - Final Report, Oregon Dept. of Environmental Quality (21 pages)
YEAR : 1982
TEXT : Evaluates the performance of experimental disposal trench systems. Includes disposal systems on steep slopes, in slowly permeable soils, or in shallow to weathered soils and fractured bedrock and presents information on design, soil characteristics, and performance for the experimental systems. (SWF)

ACC# : L001491
AUTHOR: Triangle J Council of Governments
AFFIL : Triangle J Council of Governments, Research Triangle Park, North Carolina
TITLE : Public Participation
SOURCE: Triangle J Council of Governments, Research Triangle Park, North Carolina (38 pages)
YEAR : 1983
TEXT : Public participation activities in North Carolina's Triangle J Individual Wastewater Project during 1977-1979 are summarized. The project was part of 208 regional water quality management planning in 1978. A communications specialist was given primary responsibility for promoting public participation in the project. Three advisory committees served to direct the efforts of the project's staff. To increase public awareness of and involvement in the project, the staff prepared reports, brochures, and slide presentations; conducted workshops; spoke at water-related meetings held in the region; and, made contacts at several news agencies to keep these agencies informed about wastewater-related activities. (SWF)

ACC# : L001492
AUTHOR: Ward, R.C.; Englehardt, J.D.
AFFIL : Agricultural and Chemical Engineering Department, Colorado State University
TITLE : Management of Decentralized, On-site Systems for Treatment of Domestic Wastes: Final Report
SOURCE: National Science Foundation, Grant Number ISP-8018279 (168 pages)

YEAR : 1982
TEXT : The Colorado State University study examines current strategies for technically managing onsite technology and points out the weakness in the system associated with operation and maintenance. The study also develops a thorough description of the operation and maintenance requirements needed to ensure professionally and routinely that onsite technology is functioning properly. Information on technical requirements is computerized to facilitate utilization of a community-wide evaluation of operation and maintenance cost. (AU/SWF)

ACC# : L001493
AUTHOR: Jones, D.; Miller, E.R.
AFFIL : Agricultural Engineering, Purdue University, West Lafayette, Indiana
TITLE : On-Site Waste Disposal Study Guide
SOURCE: Agricultural Engineering, Purdue University, West Lafayette, Indiana (127 pages)
YEAR : 1983
TEXT : Used as a study guide for an Indiana onsite waste disposal workshop, this manual provides state rules concerning residential sewage disposal systems. It includes a detailed description of soil properties related to onsite waste disposal systems and site evaluation procedures, and it assists homeowners, contractors, and county health personnel in determining the suitability of new homesites for construction of septic systems. The manual also recommends specific onsite systems in accordance with the site evaluation and includes evaluation forms and construction guidelines for systems. (SWF)

ACC# : L001494
AUTHOR: John, S.F.
AFFIL : Architectural and Engineering Service Corporation, 142 East Prairie Avenue, Decatur, Illinois
TITLE : Facilities Plan for the Village of Waynesville, Dewitt County, Illinois
SOURCE: Architectural and Engineering Service Corporation, 142 East Prairie Avenue, Decatur, Illinois (117 pages)
Year : 1980
TEXT : Describes a facility plan for the collection and treatment of wastewater for a rural community. Provides a community profile and wasteload information. Presents possible alternatives for meeting the community's wastewater needs. The selected plan calls for onsite systems to serve 70% of all buildings and cluster systems to serve the remaining buildings.

Existing onsite systems that were found to be acceptable were left in place, while those which were malfunctioning were rehabilitated. Existing systems violating the Illinois Department of Public Health codes were either connected to a cluster system or replaced with a new seepage field or sand filter. The two cluster systems in this project are a seepage field and a mound system.

The village is responsible for managing inspection, maintenance, disposal ordinances, and a user charge system. A private contractor will carry out maintenance tasks. The public health department will be responsible for design standards and performing site evaluation.

Also provides setting cost estimates, management plans, and implementation information. (AU/SWF)

ACC# : L001495
AUTHOR: Microphor
AFFIL : Microphor, Inc., 452 East Hill Road, P.O. Box 490, Willits, California
TITLE : Water Closet Economics: A Guide to the Practical Application of Ultra Low Flow Fixtures
SOURCE: Microphor, Inc., 452 East Hill Road, P.O. Box 490, Willits, California
YEAR : 1983
TEXT : Summarizes information concerning the application of ultra-low-flow plumbing fixtures to a variety of water and wastewater situations. Situations include sewer or water moratoria, conventional and absorption systems, alternative onsite systems, short water supplies, and high water/sewer costs. Contains several case histories and a cost comparison of extended fixtures and ultra-low-flow fixtures. (AU/SWF)

ACC# : L001496
AUTHOR: Finnemore, J.E.; Hantzsche, N.N.
AFFIL : Dept. of Civil Engineering, University of Santa Clara, Santa Clara, California; and, Questa Engineering, Point Richmond, California
TITLE : Ground-Water Mounding Due to On-site Sewage Disposal
SOURCE: American Society of Civil Engineers, 345 East 47th Street, New York, New York (7 pages)
YEAR : 1983
TEXT : Existing methods to predict mounding, mainly developed for groundwater recharge spreading basins, are reviewed for applicability to sewage disposal fields. A selected method is simplified to a single equation

which is particularly accurate after long application times. Sensitivities of the procedure to the various simplifications, site factors, and design and management options are discussed and presented in graphical form. Alternative means to reduce mounding are reviewed. (AU)

ACC# : L001497
AUTHOR: Siegrist, R.L.
AFFIL : University of Wisconsin, Madison, Wisconsin
TITLE : Minimum-Flow Plumbing Fixtures
SOURCE: American Water Works Association Journal, 75(7):342-347 (6 pages)
YEAR : 1983
TEXT : Summarizes average per capita water use in the United States and abroad. Discusses the role of minimum-flow fixtures, water reuse systems, and reduced water usage as water conservation strategies. Lists water supply, wastewater disposal, management, and economic considerations when using minimum-flow fixtures. Gives applications of minimum-flow fixtures and potential barriers to their widespread applications. (AU/SWF)

ACC# : L001498
AUTHOR: Miner, S.L.
AFFIL : Gannett Fleming Environmental Engineers, Kensington, Maryland
TITLE : Implementation Issues of On-Lot Management
SOURCE: BioCycle, 24(3)37-38 (2 pages)
YEAR : 1983
TEXT : Describes the continued use of on-lot systems as an effective alternative for wastewater treatment. A county management agency keeps centralized records of maintenance and system operation. To have their systems inspected, individual users contract directly with private firms that are licensed by the county to conduct such inspections. The article also discusses cost savings and environmental impact. (SWF)

ACC# : L001499
AUTHOR: Stephens, D.B.; Neuman, S.P.
AFFIL : Dept. of Geoscience, New Mexico Institute of Mining and Technology, Socurro, New Mexico; and, Dept. of Hydrology and Water Resources, University of Arizona, Tucson, Arizona
TITLE : Vadose Zone Permeability Tests: Unsteady Flow
SOURCE: Journal of the Hydraulics Division, Proceedings of the American Society of Civil Engineers, 108(HY5):660-677 (9 pages)
YEAR : 1982
TEXT : Saturated-unsaturated flow models are used to simulate transient conditions in four soils during constant head borehole infiltration tests in the vadose zone. Infiltration rate varies directly with saturated hydraulic conductivity and is also influenced by unsaturated soil properties, antecedent moisture conditions, anisotropy, and borehole conditions. The method recommended by the U.S. Bureau of Reclamation to determine when to terminate a test may lead to overestimating saturated hydraulic conductivity. Simple graphical procedures are developed to overcome field problems associated with large water volume requirements or long time required to reach steady state by using early time data to estimate the steady infiltration rate. (AU)

ACC# : L001500
AUTHOR: Stephens, D.B.; Neuman, S.P.
AFFIL : Dept. of Geoscience, New Mexico Institute of Mining and Technology, Socurro, New Mexico; and, Dept. of Hydrology and Water Resources, University of Arizona, Tucson, Arizona
TITLE : Vadose Zone Permeability Tests: Steady State Results
SOURCE: Journal of the Hydraulics Division, Proceedings of the American Society of Civil Engineers, 108(HY5):630-659 (10 pages)
YEAR : 1982
TEXT : Free surface and saturated-unsaturated flow models are applied to the problem of constant head borehole infiltration tests for determining saturated hydraulic conductivity above a water table. The free surface model follows the same general approach employed to develop analytical solutions, but this model does not suffer from some of the many simplifying assumptions regarding boundary conditions. Nonetheless, the results of steady state simulations with the free surface model agree rather well with the analytical solutions. The free surface approach provides a distorted view of the infiltration process.
Saturated-unsaturated models used to simulate quasi-steady state conditions indicate that only a small volume of soil in the vicinity of the borehole is completely saturated with water. Based on saturated-unsaturated simulations in four different homogeneous, isotropic soils, an empirical solution is developed for deep water table conditions to estimate saturated hydraulic conductivity with improved

accuracy. Due to the effects of borehole geometry unsaturated soil characteristics, water table depth, heterogeneity, and anisotropy, it is extremely difficult to develop a completely general formula. (AU)

ACC# : L001501
AUTHOR: Stephens, D.B.; Neuman, S.P.
AFFIL : Dept. of Geoscience, New Mexico Institute of Mining and Technology, Socurro, New Mexico; and, Dept. of Hydrology and Water Resources, University of Arizona, Tucson, Arizona
TITLE : Vadose Zone Permeability Tests: Summary
SOURCE: Journal of the Hydraulics Division, The American Society of Civil Engineers, 108(HY5):623-639 (9 pages)
YEAR : 1982
TEXT : Solutions to determine saturated hydraulic above a water table by means of constant head borehole infiltration tests are summarized and critiqued. Analytical solutions are available for open and partly cased boreholes and deep and shallow water table conditions. The formulas are based on various simplifying assumptions pertaining to soil properties and boundary conditions. None of the solutions account for capillary effects. For identical test conditions values of hydraulic conductivity calculated from these formulas may differ by as much as a few hundred percent. (AU)

ACC# : L001502
AUTHOR: Dix, S.P.
AFFIL : National Small Flows Clearinghouse, West Virginia University, 258 Stewart Street, Morgantown, West Virginia
TITLE : Alternative Wastewater Systems for Rural West Virginia Industry
SOURCE: Southern Health Association Meeting, Charleston, West Virginia, June 24, 1983 (14 pages)
YEAR : 1983
TEXT : Describes the potential application of new technologies suitable for industrial and commercial development in West Virginia. Emphasizes the need for site planning given the limited capacity of soil to treat wastewater in West Virginia. Stresses the importance of water-saving technologies in designing a treatment system. Discusses mound systems, low pressure pipe systems, and recirculating sand filters. Provides a design example and operation and maintenance information concerning the sand filter. (SWF)

ACC# : L001503
AUTHOR: Tollefson, D.J.; Kelly, R.F.
AFFIL : Winzler and Kelly Consulting Engineers, 633 Third Street, Box 1345 Eureka, California
TITLE : STEP Pressure Sewers are a Viable Wastewater Collection Alternative
SOURCE: Journal Water Pollution Control Federation, 53(7):1004-1014 (11 pages)
YEAR : 1983
TEXT : Presents information on the design, construction, operation, and maintenance of a pressure sewer installation in a small northern California community and assesses its reliability, operating costs, and maintenance costs. An active, routine maintenance program is essential to keep the system operating at a near maximum efficiency, minimizing emergency maintenance requirements and prolonging the life of system components and equipment.. (AU/SWF)

ACC# : L001504
AUTHOR: Hargett, D.L.; Tyler, E.J.; Converse, J.C.
AFFIL : College of Agricultural and Life Sciences, and College of Engineering, University of Wisconsin, Madison, Wisconsin
TITLE : Chemical Rehabilitation of Soil Wastewater Absorption Systems Using Hydrogen Peroxide: Effects of Soil Permeability
SOURCE: Small Scale Waste Management Project, University of Wisconsin, Madison, Wisconsin (86 pages)
YEAR : 1983
TEXT : Reports on recent research which examined the effectiveness of hydrogen peroxide in unclogging failed systems. Evaluates the reagent's impact on the physical properties of the soil with laboratory and field studies, and microphoretic analyses. Hydrogen peroxide can do serious, and possibly irreversible damage to the physical integrity and infiltrative capacity of most soils. Includes pore sketches, photomicrographs, and graphs and tables concerning soil-texture and infiltration rate. (AU/SWF)

ACC# : L001505
AUTHOR: Whitmore, M.
AFFIL : Boulder County Health Department, Colorado
TITLE : Boulder County's Development of an Operation and Maintenance Program for Onsite

SOURCE: Proceedings: Fifth Workshop on Home-Sewage Disposal in Colorado Operation and Maintenance of On-Site Wastewater Treatment Systems, Colorado State University, Fort Collins, Colorado (11 pages)
YEAR : 1983
TEXT : Describes a management program for onsite systems in Boulder County, Colorado. Discusses the following management functions: planning, site evaluation, design, installation, inspection and monitoring, and operation and maintenance. Provides a detailed evaluation of a subdivision from a sewage disposal survey. This evaluation will be used to implement an operation and maintenance program for that subdivision. A computer generated economic analysis for county-wide operation and maintenance program is also provided. (SWF)

ACC# : L001506
AUTHOR: Englehardt, J.D.
AFFIL : Agricultural and Chemical Engineering Department, Colorado State University, Fort Collins, Colorado
TITLE : O&M Requirements for Small Flow Technology
SOURCE: Proceedings: Fifth Workshop on Home-Sewage Disposal in Colorado Operation and Maintenance of On-Site Wastewater Treatment Systems, Colorado State University, Fort Collins, Colorado (62 pages)
YEAR : 1983
TEXT : Presents O&M recommendations and cost formulas associated with onsite sewage technology in the form of a computer printout. The computer model is capable of providing both data retrieval and cost estimation. The systems are classified into: septic tanks; septic tank effluent pump; individual aerobic plant; extended aeration package plants; rotating disk package plants; lagoons; leachfields, mounds, and evapotranspiration beds; buried sand filters; accessible sand filters; and tablet chlorinators. Each category begins with a discussion of operational problems and recommends operation and maintenance procedures to avoid these problems. Following this discussion is a list of more general recommendations concerning: procedures and schedules; personnel and contracted work; parts and supplies; equipment; power; and annual costs per home. (AU/SWF)

ACC# : L001507
AUTHOR: Heller, W.H.; Dix, S.P.
AFFIL : Engineering Professionals, Inc., Fort Collins, Colorado; and, National Small Flows Clearinghouse, West Virginia University, Morgantown, West Virginia
TITLE : I/A Approach Cost-Effective: Regulatory Agency Opposed
SOURCE: On-site Sewage Treatment-Proceedings of the Third National Symposium on Individual and Small Community Sewage Treatment 1981, American Society of Agricultural Engineers, St. Joseph, Michigan (5 pages)
YEAR : 1982
TEXT : Resistance of funding agencies to explore and demonstrate innovative/alternative approaches may "force" more expensive conventional treatment systems upon a small community. Paper describes how a cost-effective alternative system (recirculating sand filter) was chosen and planned for a subdivision through a joint county/consulting engineering firm effort. However, the state regulatory agency selected a traditional collection and treatment system which would impose greater costs to the homeowners. Because of increased costs to the engineering firm and risks associated with the alternative design, the decision of the state regulatory agency was not challenged. The authors state that regulatory agency personnel who assess alternative treatment projects should become better versed in state-of-the art I/A technology. (SWF)

ACC# : L001508
AUTHOR: Moe, P.G.; Weigand, R.G.; Moe, C.L.
AFFIL : Agricultural Microbiology, West Virginia University, Morgantown, West Virginia, Wood County Sanitarian, West Virginia Dept. of Health, Parkersburg, West Virginia; and, Environmental Microbiology, Chapel Hill, North Carolina
TITLE : The How-To of Maintaining Home Septic Tank Waste Disposal Systems
SOURCE: Cooperative Extension Service, West Virginia University, Center for Extension and Continuing Education (39 pages)
YEAR : 1981
TEXT : This manual discusses the basic operation of a septic tank system, such as septic tank functions, sizing and construction, microbial activity, and maintenance; also, soil absorption system functions and construction, leachfield failure and repair techniques. Stresses overall preventive maintenance including water conservation and lawn care. Onsite system information contacts at the local, state, and federal level are provided. (AU/SWF)

ACC# : L001509
AUTHOR: Dean, R.B.

AFFIL : LunDean Environmental Company, Copenhagen, Denmark
TITLE : Septic Tank Failures Reduced by "Aerobics"
SOURCE: BioCycle, 24(2):51-52 (2 pages)
YEAR : 1983
TEXT : Article presents an overview of anaerobic clogging in soil and methods of maintaining permeability by restoring aerobic conditions. Applies this information to septic system failures and discusses use of alternative drainfields to reduce clogging in difficult soils. Points out that drainfield change over valves must be easy to operate. Emphasizes the need for the proper management of septic systems. (AU/SWF)

ACC# : L001510
AUTHOR: EPA
AFFIL : EPA, Region 5, Water Division, 230 South Dearborn Street, Chicago, Illinois
TITLE : Rural Lakes Project Handbook
SOURCE: U.S. EPA, Region 5, Water Division, 230 South Dearborn Street, Chicago, Illinois 60604 (41 pages)
YEAR : 1983
TEXT : The EPA Rural Lakes Project Handbook relates major findings of rural wastewater studies in a format intended to be useful for home owners and civic leaders. Includes techniques for preventing and correcting problems commonly associated with on-site systems and also includes alternative technology available for small flows collection and treatment. Provides pertinent information regarding facilities planning, sources of wastewater funding at the state and federal level, and federal contacts involved in small flows technology. (AU/SWF)

ACC# : L001511
AUTHOR: Salvato, J.A.
AFFIL : Sanitary and Public Health Engineer, 44 Meadow Drive, Troy, New York
TITLE : Rational Design of Evapotranspiration Bed
SOURCE: American Society of Civil Engineers, 343 East 47th Street, New York, New York (8 pages)
YEAR : 1983
TEXT : This paper develops a rational method for the design of an onsite sewage disposal system based upon evapotranspiration, and adaptable to different geographical areas. Notes available design information and its limitations and emphasizes the need to exercise informed professional judgement. Two examples and water balance tables show application of the design method. (AU)

ACC# : L001512
AUTHOR: Machmeier, R.D.; Canfield, J.; Anderson, J.L.
AFFIL : University of Minnesota and Minnesota Pollution Control Agency, St. Paul Minnesota
TITLE : Onsite Sewage Treatment Manual
SOURCE: Agricultural Extension Service, University of Minnesota (245 pages)
YEAR : 1982
TEXT : This manual is used as the teaching text for the 1983 Onsite Sewage Treatment Workshops and serves as a reference to those who are actively involved in the design, installation, and maintenance of onsite sewage treatment systems.

The ten sections of the manual describe the following:

1. Minnesota's Individual Sewage Treatment Systems Standards which provide design criteria for the treatment of sewage under a variety of site and soil conditions;
2. site evaluation procedures;
3. septic tank and treatment of septage;
4. location and design of a soil treatment system field;
5. sewage treatment using mounds;
6. pumping station design;
7. procedures and criteria for collector sewage systems design;
8. management information;
9. recent water use studies, including names and addresses of water conservation device manufacturers;
10. procedures for evaluating existing home sewage disposal systems. (SWF)

ACC# : L001513
AUTHOR: National Sanitation Foundation
AFFIL : National Sanitation Foundation, NSF Building, Ann Arbor, Michigan, 48105
TITLE : Basic Criteria for Evaluation of Special Processes, Components or Devices Used in Treating Wastewater
SOURCE: National Sanitation Foundation, NSF Building, Ann Arbor, Michigan, 48105 (17 pages)
YEAR : 1977

TEXT : Covers the 1977 National Sanitation Foundation's basic criteria for special processes, components, or devices used in the handling, treatment, recycling, or disposal of wastewater. Analytical parameters, material qualifications, design and construction criteria, and methods for performance evaluation are outlined. (AU/SWF)

ACC# : L001514
AUTHOR: Brockway, D.G.
AFFIL : USDA Forest Service, Vancouver, Washington
TITLE : Forest Floor, Soil, and Vegetation Responses in Sludge Fertilization in Red and White Pine Plantations
SOURCE: Soil Science Society of America Journal, 47(4):776-784 (9 pages)
YEAR : 1983
TEXT : Discusses application of papermill sludge and municipal sludge to red and white pine plantations. Both sludges produced significant forest floor increases in total salt, pH, and concentrations of nitrogen and phosphorus. Movement of nutrients from the forest floor into the soil was generally limited to nitrate, ammonia, and total phosphorus leaking into the upper soil layer. Very small fluctuations in nutrient levels occurred in the soil below 15 cm. Significant increases in understory and overstory biomass occurred without metal toxicity symptoms. Evidence of enhanced potential for photosynthesis, should be more evident in the two to five years after application of sludge. (AU/SWF)

ACC# : L001515
AUTHOR: Gross, M.A.
AFFIL : The University of Arkansas, College of Engineering, Civil Engineering, Fayetteville, Arkansas
TITLE : Optimum Depth of Sand for Filtering Septic Tank Effluent
SOURCE: University of Arkansas Libraries, Fayetteville, Arkansas
YEAR : 1982
TEXT : This paper presents a study to determine the optimum depth of sand for filtering septic tank effluent. The three sand types used are coarse filter sand with an effective size of 0.52 mm, fine filter sand with an effective size of 0.274 mm, and glass sand with an effective size of 0.20 mm. By measuring the reduction of total organic carbon, turbidity, total coliform, and fecal coliform, the optimum sand depths are 10 inches of coarse filter sand, 4 inches of fine filter sand, and 10 inches of glass sand when all three sand types are used in a composite filter. Results indicate that the coarse sand reduced total organic carbon (TOC) in septic tank effluent by 59 to 89 percent. Fine sand reduced the TOC to 10 mg/1, turbidity to 1.5 NTU, and total coliform reduced an average 1361 colonies per 100 ml. Glass sand reduced total coliform to between 180 and 0 with 15 of 18 samples showing no fecal coliform per 100 ml. (AU/SWF)

ACC# : L001516
AUTHOR: McMillan, J.D.
AFFIL : Dept. of Civil Engineering, University of Maine, Orono, Maine, 04469
TITLE : Numerical Modelling of Onsite Domestic Wastewater Disposal Systems for Design Optimization
SOURCE: University of Maine Libraries, Orono, Maine, 04469
YEAR : 1982
TEXT : A numerical model for two-dimensional unsaturated soil moisture flow was developed to simulate effluent flow from a mound system. Hysteresis is included in the analysis. The main goal is to optimize design for maximum phosphorus fixation by the soil in the system. Three mound configurations were simulated using the model. The expected lifetime of the system increased with regard to phosphorus removal when an additional absorption trench was introduced or a layer of finer, less permeable soil was inserted beneath the trench. (AU/SWF)

ACC# : L001517
AUTHOR: Bogness, D.R.
AFFIL : Alaska Area Native Health Service, Anchorage, Alaska
TITLE : Sanitation Facilities Operation and Maintenance in Alaskan Native Villages
SOURCE: Environment Canada, Environmental Protection Service, Economic and Technical Review, Report EPS 3-WP-80-5, Ottawa, Ontario, Canada K1A 1C8 (9 pages)
YEAR : 1983
TEXT : Describes an operation and maintenance program utilized in sanitation facilities for rural communities in Alaska. Local operators and village residents are trained regarding their roles and responsibilities in the operation of their water and sewer system. Maintenance specialists technically assist the village on a continuous basis and provide further operator training. Operation and maintenance manuals are being developed for completed projects under this program. (AU/SWF)

ACC# : L001518
AUTHOR: State of Maine
AFFIL: State of Maine, Dept. of Human Services, Division of Health Engineering, Augusta, Maine
TITLE : State of Maine Subsurface Wastewater Disposal Rules: Chapter 241
SOURCE: Department of Human Services, Division of Health Engineering, State House, Station Number 10, Augusta, Maine 04333 (73 pages)
YEAR : 1983
TEXT : The State of Maine's subsurface disposal rules govern siting, design, construction, inspection, administration, permitting, seasonal conversion, site evaluation, design flow, drain and sewer construction, treatment tanks, design standards, and holding tanks. (SWF)

ACC# : L001519
AUTHOR: Whyman, A.D.
AFFIL : Pipe Division, DuPont of Canada Limited, Mississauga, Ontario
TITLE : Pre-Insulated High Density Polyethelene Piping - The Evolution of a Northern Achievement
SOURCE: Technical Review, Report EPS 3-WP-80-5, Ottawa, Ontario, Canada K1A 1C8 (34 pages)
YEAR : 1983
TEXT : Describes the 'SCLAIRCOR' pre-insulated piping system which is designed for cold region communities. The pipe can be used for combination water and sewer service lines. Gives a description of heat tracing and insulation designs using illustrations. (SWF)

ACC# : L001520
AUTHOR: Spencer, J.
AFFIL : Lombardo & Associates, Boston, Massachusetts
TITLE : Woodstock's Onsite Wastewater System
SOURCE: Biocycle, 24(5):51-52 (2 pages)
YEAR : 1983
TEXT : Discusses individual onsite and small communal wastewater systems being constructed for Woodstock, New York. Highlights active home owner participation, enactment of strong water conservation practices, and the development of alternative system designs. The adoption of a county-wide water conservation policy allowed for the reduction of wastewater disposal system sizes based on the level of water conservation equipment installed. System types being built include conventional subsurface absorption systems, mounded absorption systems, and a sand filter+soil absorption system. An onsite management program is being initiated to provide periodic operation and maintenance. (AU/SWF)

ACC# : L001521
AUTHOR: James, F.W.
AFFIL : Dept. of Public Works, Government of the Northwest Territories, Yellowknife, N.W.T.
TITLE : Critical Evaluation of Insulated Shallow Buried Pipe Systems in the Northwest Territories
SOURCE: Environment Canada, Environmental Protection Service, Economic and Technical Review, Report EPS 3-WPK-80-5, Ottawa, Ontario, Canada K1A 1C8 (37 pages)
YEAR : 1983
TEXT : Evaluates shallow buried insulated pipe systems in Northwest Territories. Presents design details for thaw tubes as an alternative to heat tape. Current problems, alternate solutions, and recommendations for the system components are provided. (SWF)

ACC# : L001522
AUTHOR: McAmmond, K.W.
AFFIL : Sturgeon Health Unit, St. Albert, Alberta, Canada
TITLE : Modified Low Pressure Communal Sewage Disposal Systems
SOURCE: Environment Canada, Environmental Protection Service, Economic and Technical Review, Report EPS 3-WP-80-5, Ottawa, Ontario, Canada K1A 1C8 (7pages)
YEAR : 1983
TEXT : Describes a low pressure communal sewage disposal system which was developed in Alberta, Canada. Septic tank effluent is pumped from each individual home to a lagoon located outside the community. The design calls for the pump to be located in the house basement along with all controls and valves. Flow switches are installed in the second compartment of the septic tank. The paper outlines the advantages of this system in a cold climate and includes diagrams of service connections, mains, and estimated cost. (SWF/AU)

ACC# : L001523
AUTHOR: Brockett, C.D.
AFFIL : Botany Department, University of Auckland, New Zealand
TITLE : Some Causes of Biological Instability and Their Effect on Algal Population Levels in Waste Treatment Lagoons
SOURCE: Progress in Water Technology, 9(4):941-948 (8 pages)
YEAR : 1978
TEXT : A stable facultative oxidation lagoon results from balanced biological and environmental components, e.g., oxygen production, mixing, organic decomposition and temperature. Variation in these components can yield undesirable pond conditions of decreased algal populations, odor formation, and the establishment of objectionable bacterial populations. Studies conducted at the Mangere Oxidation Ponds, Auckland, New Zealand have shown these undesirable conditions to occur in the spring and autumn. Spring conditions of rapidly increasing temperatures and accumulation of organic matter in the sludge and decreasing temperatures and daylight during autumn led to pond instability. Pond stability is reestablished upon return of favorable conditions for algal growth. (SWF)

ACC# : L001524
AUTHOR: McClelland, N.I. (editor)
AFFIL : National Sanitation Foundation
TITLE : Individual Onsite Wastewater Systems - Proceedings of the Sixth National Conference, 1979
SOURCE: Ann Arbor Science Publishers Inc., P.O. Box 1425, Ann Arbor, MI 48106 (525 pages)
YEAR : 1980
TEXT : Following the theme of "Learning from Experience," experienced users of alternative systems cover the kinds of problems for which onsite alternatives should appropriately be considered: selection criteria, management strategies, and techniques for reejuvenated systems. (editor)

Contains:

- Practice, Policy, Experience (L001294)*
- A Henry County, Indiana Experience
- Onsite Waste Treatment at a Commercial Complex (L001385)
- Decentralized Approaches to Rural Lake Wastewater Planning
- Alternative Onsite Wastewater Technology (L001298)
- Soil Factors as They Relate to Onsite Sewage Disposal
- Soil Mottling and Groundwater Monitoring (L001292)
- Two Onsite Options for Problem Soils (L001290)
- A System for High-Slope Lots (L001397)
- Enhanced Treatment for Surface Discharge (L001171)
- Evaluation of Compost Toilets (L00 1383)
- Life Within the Composting Toilet
- The Greenhouse as a Leachfield (L001301)
- Integrated Wastewater Recycling Facility
- Wastewater Recycling is Now Available (L001171)
- Individual Aerobic Plant Operation and Maintenance (L001190)
- Evapotranspiration - The Chesapeake Bay Study (L001373)
- The Michigan Freeway Rest Area System (L001310)
- Alternative Wastewater Collection Systems for Small Communities (L001302)
- Pressurized Subsurface Effluent Dosing (L001256)
- Management of Alternative Systems (L001361)
- Design and Installation Supervision by an Onsite Management District (L001358)
- Design and Installation of Small Community Systems (L001260)
- The Operation and Maintenance of the Suburbanaer (STEP) System (L001371)
- Onsite Systems for Developing Areas (F2525)
- Innovation in Onsite Treatment Systems
- Microbial Ecology of an Aerobic Recycling Onsite Treatment Plant (L001254)
- Use of Shallow, Low-Pressure Injection Systems in Large and Small Installations (L001255)
- The Gravity-Flow Septic Tank/Role of Public Agencies and Private Interests (L001275)
- Innovative and Alternative Technology for EPA's Construction Grants Program
- The National EPA Small Wastewater Flows Clearinghouse
- Virus Movement in Groundwater
- Septic Systems Leachate Surveys for Rural Lake Communities
- Aerial Sanitary Surveys in Rural Wastewater Planning (L001278)
- Electro-Osmosis
- Status Report on the Porox (L001188)
- Onsite Systems Management

(AU/SWF)

* An abstract for this paper may be found under this data base file number.

ACC# : L001525
AUTHOR: McClelland, N.I.; Evans, J.E. (editors)
AFFIL : National Sanitation Foundation
TITLE : Individual Onsite Wastewater Systems - Proceedings of the Seventh National Conference, 1980
SOURCE: Ann Arbor Science Publishers Inc., P.O. Box 1425, Ann Arbor, MI 48106 (355 pages)
YEAR : 1981
TEXT : The theme of the Seventh NSF/EPA National Conference on Individual Onsite Wastewater Systems was the appropriate utilization of onsite technologies. Speakers selected for the program represented a cross section of interests in the wastewater management field. The Proceeding's papers report experiences in the use of a broad range of alternatives, from traditional septic tank-soil adsorption systems to water conservation-recycle/reuse systems and alternative off-site transport/disposal systems.

Contains:

- Environmental Legislation in the 80s: Putting Construction Grants into Perspective
- Siting and Sizing Leach Fields in Larimer County (L001088)*
- Selection of an Appropriate Wastewater Disposal System (F2365)
- Electro-Osmosis System
- Utilization of Mound Systems for Sewage Disposal in Pennsylvania
- The Impact of Water Conservation on Onsite Wastewater Management (L001111)
- Field Evaluation of Compost Toilets (F2372)
- Integrated Black/Greywater Treatment
- A Study of Septic Tank Soil Absorption System
- Experiences with the Use of Aerobic Plants and Soil Absorption Systems (L001193)
- Effluent Distribution and the Significance to System Performance (L001094)
- Evapotranspiration Experiment in South Carolina: 1972-1974
- What's So Great About Lagoons?
- Aerobic Treatment and Effluent Filtration
- Operating Experience and Costs from Some Grinder Pump Pressure Sewer Systems (L001010)
- Community Onsite Disposal Systems: The Iselin Demonstration Project (L001180)
- Land Treament of Septage (L001122)
- Onsite Disposal in the Granite State
- The Wisconsin Experience with Alternative Private Sewage Systems
- California's Experience with Innovative and Alternative Wastewater Systems
- Progress in EPA's Innovative and Alternative Technology Program
- Obstacles to Acceptance and Effective Utilization of Alternatives and Innovations Under the Clean Water Act
- Clean Water Act--Opportunity or Liability?
- Design of Solar-Assisted Wastewater Disposal Systems
- The Potential Role of Aquaculture in Wastewater Management
- Public-Oriented Program
- Training of System Installers for Onsite Waste Systems
- Education and Promotion Among Public Officials and Consultants (F2379)
- Management--A Many Splendored Word (L0C1099)
- EPA Strategy for Promoting Implementation of Small Alternative Systems
- The Last Flush

(AU/SWF)

* An Abstract for this paper may be found under this data base file number

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ACC# : L001526
AUTHOR: Dierberg, F.E.; Brezonik, P.L.
AFFIL : Dept. of Environmental Engineering Sciences, University of Florida, Gainesville, Florida and the Center for Wetlands, University of Florida, Gainesville, Florida
TITLE : Nitrogen and Phosphorus Mass Balances in Natural and Sewage-Enriched Cypress Domes
SOURCE: Journal of Applied Ecology 20(1):323-337 (15 pages)
YEAR : 1983
TEXT : Compares nitrogen and phosphorus mass balances in natural and sewage enriched cypress domes. Effluent application inhibited nitrogen fixation and enhanced denitrification. The sewage enriched dome lost six times more nitrogen and sixteen times more phosphorus by infiltration than did the natural dome. Losses from surface run offs

were insignificant. Storage of nutrient inputs were much higher in the natural dome than in the sewage-enriched dome. (AU/SWF)

ACC# : L001527
AUTHOR: Sandhu, S.S.; Warren, W.J.; Reed,A.
AFFIL : South Carolina State College, Orangeburg, South Carolina, and Claflin College, Orangeburg, South Carolina
TITLE : Movement and Degradation of Septic Tank Pollutants in Soil
SOURCE: South Carolina State College, Orangeburg, South Carolina, Research Bulletin No. 20 (82 pages)
YEAR : 1981
TEXT : Presents a study of the mode and extent of transport of arsenic, linear alkylbenzene sulfonate (LAS), and coliform group organisms from the point of their discharge to the drinking water supply sources of the rural communities. The degradation of LAS is also modeled. The distribution of arsenic in soils showed an experimental relationship with depth, while LAS distribution showed chromatographic effects. The presence of LAS generally accelerated arsenic mobility in soils. Soils used in the study were ineffective in filtering out E coli from the percolating water if the column length was less than 50.0 cm. (SWF)

ACC# : L001528
AUTHOR: Pennsylvania Intergovernmental Council
AFFIL : Pennsylvania Intergovernmental Council, P.O. Box 1288, Harrisburg, Pennsylvania
TITLE : Rural Wastewater Systems: Practical Alternatives for Small Communities in Pennsylvania
SOURCE: Pennsylvania Intergovernmental Council P.O. Box 1288, Harrisburg, Pennsylvania (40 pages)
YEAR : 1982
TEXT : Discusses in layman's terms alternatives in wastewater treatment for rural communities in Pennsylvania. Chapter 2 describes various on-lot treatment methods including septic and aerobic tanks with soil absorption beds, subsurface sand filters, oversized absorption areas, shallow placement absorption areas, elevated sand mounds, and dosing. Another section deals with cluster systems including subsurface drainage areas, elevated sand mounds, subsurface sand filters, and innovative collection systems. The final section deals with community systems such as recirculating sand filters, package treatment plants, and marsh/pond/meadow systems. Chapter 3 focuses on management strategies in implementation and planning of rural community wastewater systems. Chapter 4 covers financing of wastewater systems through general obligation bonds, revenue bonds, bond anticipation notes, and federal and state aid. Chapter 5 lists addresses of individuals and organizations in Pennsylvania that can provide technical assistance for community wastewater systems. (SWF)

ACC# : L001529
AUTHOR: Freedman, D.
AFFIL : Environmental Protection Division, Georgia Department of Natural Resources, 270 Washington St. S.W., Atlanta, Georgia
TITLE : Small Community Land Treatment in Georgia
SOURCE: Wastewater Technology Workshop on Innovative and Alternative Approaches, University of Florida Center for Training, Research, and Education for Environmental Occupations, Gainesville, Florida, June, 1983 (14 pages)
YEAR : 1983
TEXT : Describes several small communities that are implementing land treatment wastewater systems funded by the State of Georgia through the EPA Concentration Grants program. Provides information on cost, design parameters, and funding of systems which are in operational-design and planning stages. Includes spray irrigation and overland flow systems. (SWF)

ACC# : L001530
AUTHOR: Rich, L.G.
AFFIL : Environmental Systems Engineering, Clemson University
TITLE : Low-Maintenance Mechanically Simple Wastewater Treatment Systems
SOURCE: McGraw Hill Book Company (219 pages)
YEAR : 1980
TEXT : Wastewater treatment processes which are reliable, mechanically simple, and require little maintenance are presented in easy-to-read textbook form. These systems are designed to treat most wastewater discharges of 1 mgd or less. Systems discussed include activated sludge, lagoons, septic tanks, trickling and intermittent sand filters, and land disposal. Design procedures for several of the systems are outlined. (SWF)

ACC# : L001531

AUTHOR: Chang, A.C.; Page, A.L.; Warneke,J.E.
AFFIL : Dept. of Soil and Environmental Science, University of California, Riverside, California
TITLE : Soil Conditioning Effects of Municipal Sludge Compost
SOURCE: American Society of Civil Engineers, 345 East 47th Street, New York, New York, (5 pages)
YEAR : 1983
TEXT : This report describes an experiment which quantitatively measures the effect of sewage sludge on the physical properties of receiving soils in terms of four factors: (1) bulk density; (2) hydraulic conductivity; (3) water holding capacity; and (4) modulus of rupture. Results indicated that the agronomic nature of the soil may be improved by such sludge application. The amount of sludge required to induce significant changes in soil properties is greater than the amount normally used to satisfy nutrient requirement for crop growth. Conditioning soil by using sewage sludges results in a reduction of soil bulk density and cohesion, and an inrease in water holding capacity and hydraulic conductivity. (AU)

ACC# : L001532
AUTHOR: Viraraghavan, T.
AFFIL : ADI Limited, Consulting Engineers, Fredericton, New Brunswick, Canada
TITLE : Septic Tank Systems-Effects on Environmental Quality
SOURCE: Preprint 80-601, Proceedings of ASCE Convention Exposition, Florida (14 pages)
YEAR : 1980
TEXT : Discusses the environmental effects of onsite systems and outlines conditions that most frequently cause septic tank system failures. Contains an overview of factors which contribute to groundwater contamination due to migration of nitrogen, phosphorus, bacteria and viruses. Lists current methods of septage disposal and alternatives for treating septage. (SWF)

ACC# : L001533
AUTHOR: Morgan, P.; Chimbunde, E.
AFFIL : Blair Research Laboratory, Harari, Zimbabwe
TITLE : Improved Ventilated Pit Latrines for Rural Areas
SOURCE: Appropriate Technlogy, 9(2):10-14 (4 pages)
YEAR : 1982
TEXT : Describes the basic components and operating principles of an improved ventilated pit privy. Construction details are given for two types: 1) log base with mud and wattle, and 2) concrete base and brick version. Maintenance requirements of ventilated pit privies are provided. (SWF)

ACC# : L001534
AUTHOR: Okubo, T.; Matsumoto, J
AFFIL : Nippon Jogesuido Sekkei Co. Ltd, 1-9-5 Kaigan Minato-ku, Tokyo 105 and Dept. of Civil Engineering, Tohoku University Sendai 980, Japan
TITLE : Biological Clogging of Sand and Changes of Organic Constituents During Artificial Recharge
SOURCE: Water Research 17(7):813-821 (9 pages)
YEAR : 1983
TEXT : A Japanese experiment analyzes the biological clogging process and the constitutional change of organic compounds under prolonged submergence. The biological clogging process is divided into three stages: aerobic period, transitional period, and anaerobic period. Infiltration rate through each stage is analyzed. Also, a equation which can predict the change of accumulated specific discharge is derived from experimental results. (AU/SWF)

ACC# : L001535
AUTHOR: Seidel, K. ; Filip, Z.; Dizer, H.
AFFIL : Institut fur Wasser-, Boden-und Lufthygiene des Bundesgesundheitsamtes Corrensplatz 1, D-1000 Berlin 33, West Germany
TITLE : Distribution of Enteric Viruses and Microorganisms in Long-Term Sewage-Treated Soil
SOURCE: Water Science and Technology, 15:129-133 (5 pages)
YEAR : 1983
TEXT : To determine whether long-term sewage treatment can take place without a pollution risk for soil and groundwater, samples from sewage irrigation fields in West Berin which have been in use since about 1890 were analyed for enteric viruses and microorganisms. Enteric viruses were detected in only seven samples from a total number of eighty-seven taken from different soil depths. With only one exception, no viuses were detected in groundwater samples. Long-term sewage irrigation did not result in significant changes in the colony counts of aerobic soil bacteria, but the counts of anaerobic bacteria and actinomycetes were slightly elevated and those of microscopic fungi

slightly decreased. Potentially pathogenic bacteria were not detected in soil below 90 cm. (AU)

ACC# : L001536
AUTHOR: Lance, J.C.; Gerba, C.P.
AFFIL : U.S. Water Conservation Laboratory, U.S. Dept. of Agriculture, Phoenix, Arizonia
TITLE : Virus Removal with Land Filtration
SOURCE: Water Reuse, Ann Arbor Science Publishers, Ann Arbor, Michigan (20 pages)
YEAR : 1982
TEXT : Describes factors controlling virus movement and survival through various soils and land treatment systems, using data from laboratory batch, column, and field studies. Some significant factors include ionic strength f the suspending solution, flow velocity, temperature soil drying, and the oxygen content of the environment. (SWF)

ACC# : L001537
AUTHOR: Tchobanoglous, G.; Stowell, R.; Ludwig, R.; Colt, J.; Knight, A.
AFFIL : Dept. of Civil Engineering and the Dept. of Land, Air, and Water Resources, University of California, Davis, CA 95616
TITLE : The Use of Aquatic Plants and Animals for the Treatment of Wastewater: An Overview
SOURCE: Aquaculture Systems for Wastewater Treatment: Seminar Proceedings and Engineering Assessment, September 11-12, 1979, University of California, Davis, CA (21 pages)
YEAR : 1979
TEXT : The general concepts involved in the design and use of aquatic systes are presented and the implications are discussed in this overview. The probable roles of aquatic plants and animals of aquatic systems for treating wastewater are tabulated. An aquatic processing unit is defined and diagrams of some aquatic processing units for treating wastewater are presented. The article includes cost and energy-use data for activated sludge and artificial wetland treatment systems for plants treating 0.1, 0.5, and 1.0 MGD. (AU/SWF)

ACC# : L001538
AUTHOR: Helle, S.C., PE
AFFIL : Boyle Engineering Corporation, Orlando, FL
TITLE : Tertiary Treatment of Wastewater Using Flow-through Wetlands
SOURCE: WATER/Engineering & Management, May 1983 (2 pages)
YEAR : 1983
TEXT : Describes a study which implements a flow-through wetland system for additional treatment of secondary effluent. Gives recommendations on nitrification and phosphorus removal required prior to discharging the effluent into the wetland. Suggests less than 1 mgd for 100 acres, 30 days detention and a most direct flo path of greater than 1500 feet. (AU/SWF)

ACC# : L001539
AUTHOR: Rich, L.G.
AFFIL : Department of Environmental Systems Engineering, Clemson University, Clemson, South Carolina, 29631
TITLE : Influence of Multicellular Configurations on Algal Growth in Aerated Lagoons
SOURCE: Water Research, 16(6):929-931 (3 pages)
YEAR : 1982
TEXT : Proposes a theory which the author then uses to analyze the influence of multicellular configuration and retention time on algal growth in aerated lagoon systems. Describes a study which supports this theory. Multicellular systems reduce the amount of effluent which is retained longer than average. (SWF)

ACC# : L001540
AUTHOR: D'Itri, F.M.
AFFIL : Institute of Water Research, Michigan State University, East Lansing, MI
TITLE : Managing Vegetation in Wastewater Application
SOURCE: BioCycle, 22(6):30-34 (5 pages)
YEAR : 1981
TEXT : Summarizes papers presented at a conference/workshop on "The Selection of Vegetation for Slow Rate and Overland Flow Application System to Treat Municipal Wastewater in the Great Lakes Region." Selecting spray irrigation and overland flow applications systems depends on the size of the community and the expertse of local system operators,as well as the cost, quantity, and types of land available. Nitrogen removal is a major system consideration to prevent excess nitrate-nitrogen from leaching into the groundwater. Crop management systems

may involve row crops, non-row forage crops, or an intercropping of both. Forested systems are limited to slow-rate irrgation application. The management of a forested system depends on forest cover types, soil, hydrology and climate. The article discusses research needed in overland flow, slow rate, and forested systems. (SWF)

ACC# : L001541
AUTHOR: Quigley, J.T.
AFFIL : University of Wisconsin, Madison, Wisconsin
TITLE : Improved Design Criteria for Aeration Systems
SOURCE: Aeration Industries, Inc., Hazeltine Gates, Chaska, Minnesota (32 pages)
YEAR : 1980
TEXT : Presents whole-basin circulation as an energy efficient way to control solids in an aerated lagoon system. Mechanical characteristics, mixing and oxygen transfer advantages, and winter performance advantages of the Aire-O2 aeration system for lagoon treatment are discussed. Detailed lagoon performance data are reported. Includes a case history of the upgrading of the Zumbrata, Minnesota wastewater treatment plant where an Aire-O2 system was added. Design calculations for complete and partially mixed ponds are given. (AU/SWF)

ACC# : L001542
AUTHOR: Bitton, G.; Farrah, S.R.; Rukin, R.H.; Butner, J.; Chou, Y.J.
AFFIL : Dept. of Environmental Engineering Sciences and the Dept. of Microbiology and Cell Sciences, University of Florida, Gainesville, Florida
TITLE : Survival of Pathogenic and Indicator Organisms in Ground Water
SOURCE: Ground Water, 21(4):405-410 (6 pages)
YEAR : 1983
TEXT : A comparative study was undertaken on the decay rates of three bacterial types (S. typhimurium, E. coli, and S. faecalis), an enterovirus (poliovirus type 1), and a bacterial phage (f2) in ground water maintained under laboratory conditions. Except for f2 phage, all the microorganisms tested were relatively stable in ground water. S. faecalis survived best among all the bacteria tested and its decay rate was similar to that of poliovirus type 1. Under field conditions, bacterial indicators were also found to be stable in the ground-water environment. The decay rate for fecal streptococci was lower than for fecal or total coliforms in the shallow wells. (AU)

ACC# : L001543
AUTHOR: Wolverton, B.C.
AFFIL : ational Space Technology Laboratories, ERL, NASA, NSTL Station, Mississippi, 39529
TITLE : Engineering Design Data for Small Vasuclar Aquatic Plant Wastewater Treatment Systems
SOURCE: Aquaculture Systems for Wastewater Treatment: Seminar Proceedings and Engineering Assessment, September 11-12, 1979, University of California, Davis, CA (14 pages)
YEAR : 1979
TEXT : Presents a general background of the research findings of the National Aeronautics and Space Administration's Vascular Aquatic Plant Program which used higher plants, such as the water hyacinth and duckweed, to treat domestic wastewater. New data on asmall, two-cell lagoon system using only duckweed are included. BOD data obtained along with the results of the previous field experiments are used to develop dosing criteria for small wastewater treatment systems which serve a maximum of 3,000 people. The criteria for these systems are based upon BOD and suspended solids reduction, odor control, and sludge accumulation. (AU, SWF)

ACC# : L001544
AUTHOR: Wright, K.R.
AFFIL : Wright-McLaughlin Engineers, Denver, CO
TITLE : Sewage Effluent Turned to Snow: Provides Storage, Removes Pollutants
SOURCE: Civil Engineering-ASCE (2 pages)
YEAR : 1976
TEXT : Engineers studied the feasibility of storing treated effluent in the form of snow and ice crystals during the winter as an alternative to reservoir storage. Conventional snow-making guns were used with water drawn from a sewage treatment aerated lagoon. Test samples were taken from pond, snow pack, and runoff. Snow was produced primarily in February, although attempts were made in March and April. Physical appearance and odor of wastewater snow was similar to natural snow. Specific pollutants, fecal coliform bacteria concentration, total dissolved soldis, BOD-5, and pH all decreased during the experiment period. (SWF)

ACC# : L001545
AUTHOR: Heath, M.
AFFIL : Assistant Director, Institute of Government, Chapel Hill, North Carolina
TITLE : Southeestern State and Local Regulatory Programs for On-Site Sewage Treatment Systems
SOURCE: 1982 Southeastern On-Site Treatment Conference, the North Carolina Division of Health Services and the Soil Science Department, N.C. State University, Raleigh, North Carolina (3 pages)
YEAR : 1982
TEXT : Presents the similarities and differences among site evaluation, permits, permit considerations and fees, jurisdiction at state and state-local levels, regulation enforcement, administrative and judicial appeals, certification or registration of sanitarians, and the authority of cities, counties, and districts to install and maintain septic tanks in North Carolina, South Carolina, Virginia, Tennessee, Kentucky, and Florida. (SWF)

ACC# : L001546
AUTHOR: Nichols, D.S.; Prettyman, D.; Gross, M.
AFFIL : North Central Forest Experiment Station, Forestry Sciences Laboratory Grand Rapids, Minnesota, and Superior National Forest, Duluth Minnesota
TITLE : Movement of Bacteria and Nutrients from Pit Latrines in the Boundary Waters Canoe Area Wilderness
SOURCE: Water, Air, and Soil Pollution, 20(2):171-180 (10 pages)
YEAR : 1983
TEXT : Describes both the movement of fecal bacteria, nitrogen, and phosphorus from pit latrines and the effectiveness of peat latrine liners in reducing this movement. A peat liner should be viewed as an additional protection against phosphorus and bacteria movement rather than as a substitute for proper soil conditions. Because of dilution, nitrogen is not likely to have a discernible impact on water quality. Latrines should not be built on thin, rocky soils. (AU/SWF)

ACC# : L001547
AUTHOR: Fritton, D.D.; Sharpe, W.E.; Jarrett, A.R.; Cole, C.A.; Petersen, G.W.
AFFIL : Colleges of Agriculture and Engineering and Capitol Campus, Pennsylvania State University, University Park, Pennsylvania
TITLE : Restoration of Failing On-Lot-Sewage Disposal Areas
SOURCE: Institute for Research on Land and Water Resources, Pennsylvania State University, University Park, Pennsylvania, June, 1983 (137 pages)
YEAR : 1983
TEXT : Describes a project evaluating water conservation and absorption bed resting for restoring failing on-site sewage disposal areas. Water conservation devices were installed in homes with failing disposal areas at (maximum, moderate, or minimum levels) of predicted water reduction capability. At three of the minimum water coservation homes, effluent was also diverted to a specially-designed alternate trench for ten months, permitting the main absorption area to rest. Maximum levels of water conservation were generally successful in restoring failing absorption beds, while lesser levels of conservation were not. Absorption bed resting also succeeded in restoring failing systems. Failing absorption beds could also be restored by allowing them to rest. However, the level of effluent ponded in the beds has been rising, suggesting that the effluent will have to be directed to the alternate trench regularly. (AU/SWF)

ACC# : L001548
AUTHOR: Bouma, J.; Belmans, C.; Deker, L.W.; Jeurissen, W.J.M.
AFFIL : Dept. of Soil Physics, Netherlands Soil Survey Institute, Box 98, 6700 AB Wageningen, The Netherlands
TITLE : Assessing the Suitability of Soils with Macropores for Subsurface Liquid Waste Disposal
SOURCE: Journal of Environmental Quality, 12(3):305-311 (7 pages)
YEAR : 1983
TEXT : The associated transient soil physical conditions, which govern purification processes, were measured experimentally in soil columns and in situ, and were predicted by simulation in three soils, two of which had macropores. Predictions involved computer simulation of pressure heads during infiltration and redistribution, and of outflow rates in the columns. Ponding times and drainage rates can be predicted using the computer program's algorithm. (AU/SWF)

ACC# : L001549

AUTHOR: Dedman, R.L.
AFFIL : John Coleman Hayes and Associates, Inc., 2401 Hillsboro Rd., Nashville, Tennessee 37212
TITLE : Small Diameter Sewer Alternatives, Background and Introduction
SOURCE: A Tennessee Water Quality Association Presentation, Feb. 12, 1982
YEAR : 1982
TEXT : Using an outline and overheads, the document discusses Tennessee's growing health hazard associated with the high cost of septic tanks and the lack of enforcement action to correct failing systems. Small-diameter sewers are offeredas an economical alternative to the $38-per-foot cost of building conventional gravity sewers. General comparisons are made and layouts given for conventional gravity, pressure, grinder, vacuum, septic tank effluent gravity, and septic tank effluent pump systems. A detailed layout, the design criteria, and the case history for a small-diameter gravity sewer for 510 customers of Lafayette, TN is presented. (SWF)

ACC# : L001550
AUTHOR: Irvine, R.L.; Carvajel, E.B.
AFFIL : University of Notre Dame, Notre Dame, Indiana
TITLE : Sequencing Batch Reactors for Municipal Compliance over a Wide Range of Effluent Quality
SOURCE: Proceedings from a Workshop on Low-Cost Wastewater Treatment. Municipal Environmental Research Laboratory, U.S. EPA and Department of Agricultural Engineering, Clemson University, Clemson, S.C., April 19-21, 1983 (18 pages)
YEAR : 1983
TEXT : Describes in detail the five periods of the sequencing batch reactor process: fill, react, settle, draw, and idle. Provides actual effluent and influent quality daa from the Culver facility, as well as details from various laboratory experiments. Implementing different aeration/mixing/no-mixing control strategies during fill and react periods provides flexibility in operation and nutrient removal. (SWF)

ACC# : L001551
AUTHOR: Wolfson, M.M.
AFFIL : Local Assistance Section, New York State Department of Environmental Conservation, 50 Wolf Road, Albany, New York
TITLE : Rural Wastewater Planning
SOURCE: Journal Water Pollution Control Federation, 55(8):1042-1050 (9 pages)
YEAR : 1983
TEXT : Describes the past use of the EPA construction grants in project planning for a town's rural wastewater disposal problems. Provides a community profile, survey results, and alternative analysis. The author concludes that the current EPA program does not incorporate a suitable procedure for solving wastewater problems in small communities. He offers recommendations to enhance rural wastewater disposal planning. (AU/SWF)

ACC# : L001552
AUTHOR: Frick, A.
AFFIL : Maine Department of Human Services, Division of Health Engineering
TITLE : Site Evaluation for Subsurface Wastewater Disposal Design in Maine
SOURCE: Maine Department of Human Services, Division of Health Engineering, (second edition), 1983 (56 pages)
YEAR : 1983
TEXT : Presents a training guide for site evaluation of subsurface wastewater disposal systems in Maine. The manual is divided into five sections consisting of a description and general design features for the treatment tank, disposal field, pumping, and dosing equipment; site evaluation including such areas as zoning, easements, slope and surface drainage of terrain, land use, and design and field layout; soil evaluation including quality, structure, texture, and classification; information necessary to apply for a subsurface wastewater disposal permit; special considerations such as variances to the rules, cluster systems, and malfunctioning systems. (SWF)

ACC# : L001553
AUTHOR: Reed, S.C.
AFFIL : USACRREL, Hanover, NH
TITLE : Design, Operation and Maintenance of Land Application Systems for Low Cost Wastewater Treatment
SOURCE: Workshop for Low-Cost Wastewater Treatment, Clemson, S.C., April 19-21, 1983
YEAR : 1983
TEXT : Reasons for land application's popularity are given along with aids

in gaining public acceptance for land application projects. Brief descriptions of slow rate, rapid infiltration, and overland flow are discussed. Site selection requirements and system design criteria are provided for each of the three technologies. Skill requirements, staffing needs, site management and monitoring system demands are also discussed for each of the three technologies. (SWF)

ACC# : L001554
AUTHOR: Carlile, G.L.; Tyler, E.J.
AFFIL : Texas A&M University, College Station, TX; and Wisconsin Geological and Natural History Survey, Department of Soil Science, and Small Scale Waste Management Project, University of Wisconsin, Madison, WI
TITLE : Research Needs-Soil Science and Soil Absorption of Wastewater and Critique of Research Needs-Soil Science Absorption of Wastewater
SOURCE: Proceedings from a Workshop on Research Needs Relating to Soil Absorption of Wastewater, Colorado State University, Fort Collins, CO, June 1-3, 1983
YEAR : 1983
TEXT : Presents the research needs related to soil science and onsite wastewater systems discussed at the NSF-sponsored Workshop on Research Needs Relating to Soil Absorption of Wastewater. The presentation by Dr. Carlile and critique by Dr. Tyler explain how problems with septic tank/soil absorption can cause eventual failure of the system. They both discuss the research required to solve problems in the following areas: biological clogging mat, hydraulic soil properties, system design, and large systems. (SWF)

ACC# : L001555
AUTHOR: Olivieri, V.P.; Morrison, S.M.
AFFIL : Environmental Health Engineering, Johns Hopkins University, Baltimore, MD and the Department of Microbiology and Environmental Health, Colorado State University, Fort Collins, CO
TITLE : Research Needs-Health Implications of Bacteria and Parasites in Soil Absorption of Wastewater
SOURCE: Proceedings from a Workshop on Research Needs Relatingto Absorption of Wastewater, Colorado State University, Fort Collins, CO, June 1-3 1983 (41 pages)
YEAR : 1983
TEXT : Discusses research needs relating to microorganisms and wastewater treatment in onsite systems. The following paper presents better recovery methoologies for pathogenic bacteria, better recovery methodologies for protozoa cysts and helminth eggs and larvae, definition of the molecular mechanisms for removal and inactivation of bacteria and parasites, and identification of more useful indicator organisms. Includes a summary, an introduction, Olivieri's presentation, and Morrison's critique of the presentation. (AU/SWF)

ACC# : L001556
AUTHOR: Sikora, L.J.; Lindsay, W.L.
AFFIL : USDA-ARS, Beltsville, MD and Department of Agronomy, Colorado State University, Fort Collins, CO
TITLE : Research Needs-Soil Chemistry Aspects of On-Site Wastewater Treatment Systems
SOURCE: Proceedings from a Workshop on Research Needs to Soil Absorption of Wastewater, Colorado State University, Fort Collins, CO, June 1-3, 1983 (25 pages)
YEAR : 1983
TEXT : Discusses research needs relative to soil chemistry and soil absorption. The three major areas discussed are: nitrogen loading and dentrification; phosphorus chemistry in seepage beds; and effects of constitutents in effluent on crust stability. Includes a summary and an introduction to the workshop presentation by Dikora and a critique of the presntation by Lindsay. (AU/SWF)

ACC# : L001557
AUTHOR: Sobsey, M.D.; Cliver, D.O.
AFFIL : Dept. of Environmental Sciences and Engineering, School of Public Health, University of North Carolina, Chapel Hill, NC and Food Research Institute and Dept. of Bacteriology, University of Wisconsin, Madison, WI
TITLE : Virology Considerations in Soil Absorption of Wastewater: Review of the Literature and Research Needs
SOURCE: Proceedings from a Workshop on Research Needs Relting to Soil Absorption of Wastewater, Colorado State University, Fort Collins, Colorado, June 1-3, 1983 (56 pages)
YEAR : 1983
TEXT : Presents research need concerning enteric viruses and soil absorption systems for treating wastewater. Summarizes topics in the following categories: enteric viruses; septic tanks and septic wastes; soil

absorption systems; field studies; relationships between enteric viruses, fecal indicator bacteria and other wastewater constitutents; predictive models for design and operation of on-site and sewage treatment systems. Includes a summary, an introduction to the presentation, Sobsey's presentation, and Cliver's critique of the talk/paper. (AU/SWF)

ACC# : L001558
AUTHOR: EPA-US; Urban Scientific and Environmental Research, Inc.
AFFIL : Environmental Protection Agency, Office of Water Program Operations Washington, D.C., 20560
TITLE : Affluent Effluent: New Choices in Wastewater Treatment
SOURCE: U.S. EPA-Office of Water Program Operations, Publication (WH-547) (58 pages)
YEAR : 1983
TEXT Provides detailed information on each of the case studies presented in the film, "Affluent Effluent". The cases are divided into four categories: onsite and small systems, conventional treatment with alterative or innovative add-ons, non-conventional systems, and non-structural approaches for wastewater management. Cites contacts for further information following each case history. (AU/SWF)

ACC# : L001559
AUTHOR: Reed, S.C.
AFFIL : Senior Environmental Engineer, U.S. Army Cold Regions Research and Engineering Laboratory, Hanover, NH
TITLE : Nitrogen Removal in Wastewater Stabilization Ponds
SOURCE: Presented at 56th Annual Conference of the Water Pollution Control Federation, Oct. 2-7, 1983, Atlanta, Georgia (27 pages)
YEAR : 1983
TEXT : A rational procedure for estimating nitrogen removal in facultative wastewater stabilization ponds has been developed and validated. The procedure, based on first-order plug-flow kinetics, is dependent on pH, temperature, and residence time. The model was developed from extensive data obtained at four facultative ponds in various parts of the U.S. and was validated with independent data from five pond systems in the U.S. and Canada. The procedure should be useful whenever system design criteria require nitrogen removal or nitrification. It should be particularly helpful for the pond component of land treatment systems when nitrogen is the limiting design parameter. (AU)

ACC# : L001560
AUTHOR: Gloyna, E.F.; Tischler, L.F.; Ford, D.L.
AFFIL : University of Texas, Engineering Science, Austin, TX
TITLE : Low-Cost Systems and the Future
SOURCE: Low-Cost Wastewater Treatment Workshop, Clemson, S.C., April 19-21, 1983 (18 pages)
YEAR : 1983
TEXT : Presents an overview of waste stabilization pond systems and provides performance data for both domestic and industrial systems. Recognizes a need for more flexibility in effluent total suspended solids limitations for stabilization ponds and recommends new procedures for evaluating stabilization pond performance. (SWF)

ACC# : L001561
AUTHOR: Uebler, R.L.
AFFIL : Soil Specialist, Sanitation Branch, N.C. Division of Health Services, Greenville, NC
TITLE : Treatment of Wastewater by Soil Absorption as Affected by Loading Rate and Soil Amendments
SOURCE: 1982 Southeastern On-Site Treatment Conference Proceedings, North Carolina Division of Health Services and Soil Science Department, N.C. State University (4 pages)
YEAR : 1982
TEXT : Presents a study comparing various wastewater loading rates and the use of cement and lime amendments on wastewater treatment by soil absorption. The amendments stabilized the hydraulic properties of the trench/soil interface and created a more favorable environment for nitrification. Differences in ammonium or nitrate concentration between loading rates were not significant. Provides graphs of ammonium and nitrate concentrations over time. (SWF)

ACC# : L001562
AUTHOR: Hammer, D.E.; Kadlec, R.H.
AFFIL : Department of Chemical Engineering, University of Michigan, Ann Arbor MI 48109
TITLE : Design Principles for Wetland Treatment Systems (Project Summary)
SOURCE: Project Summary - U.S. EPA - Research and Development, May 1983

EPA-600/52-83-026 (8 pages)
YEAR : 1983
Reports key findings from research dealing with design principles for wetland treatment. Provides tables and graphs of existing wetland processes. Equations expressing mass transfer of contaminants are derived. Lists and discusses key items for estimating costs and operation of wetland systems. (SWF)

ACC# : L001563
AUTHOR: Chan, H.T.; Sykes, J.F.
AFFIL : Ontario Hydro, 800 Kipling Ave., Toronta, Ontario, Canada; and the University of Waterloo, Waterloo, Ontario, Canada
TITLE : Ground-Water Mounding Beneath a Large Leaching Bed
SOURCE: Ground Water, 22(1): 86-93 (8 pages)
YEAR : 1984
TEXT : An 84 m (276 ft) by 64 m (205 ft) experimental leaching bed was constructed to receive the secondary effluent from the Norwood, Ontario sewage treatment plant. The distribution system consisted of 100-mm diameter perforated pipes laid 2.1 m apart in 0.45 m wide trenches. The main soil layer at the test site was sandy silt. Ground-water levels at the site were measured approximately weekly at 36 piezometers for a period of about 2 1/2 years. An initial hydraulic loading of 122,700 l/day caused surface ponding. A reduced loading of 40,900 l/day was then used for most of the study period. Ground-water level fluctuations beneath and adjacent to the leaching bed were attributed to seasonally varying infiltration and hydraulic loading. The experimental data were simulated using a transient two-dimensional, phreatic integrated depth finite-element model and an analytic solution for ground-water mounding. Results from the study indicated that seasonal infiltration was a controlling factor in determining leaching bed design loads. Both mathematical models were found adequate for design. (AU)

ACC# : L001564
AUTHOR: Osborne, D.J.
AFFIL : Soil Scientist, Soil Science Department, N.C. State University, Raleigh, NC
TITLE : Policy Overview: Three-State On-Site Waste Management Programs
SOURCE: 1982 Southeastern On-Site Treatment Conference Proceedings, North Carolina Division of Health Services and Soil Science Department, N.C. State University (5 pages)
YEAR : 1982
TEXT : Defines and compares the policies and divisions of authority for regulating design, construction, and operation of onsite systems in Maine, New Mexico, and North Carolina. (SWF)

ACC# : L001565
AUTHOR: Terry, C.E.; Franklin, L.B.
AFFIL : Claude Terry & Associates, Inc.
TITLE : Design Considerations for a Small Wasteflow Management Agency
SOURCE: 1982 Southeastern On-Site Treatment Conference Proceedings, North Carolina Division of Health Services and Soil Science Department, N.C. State University (6 pages)
TEXT : Strategies for structuring a public management agency for onsite systems are described along with EPA requirements. Gives the assignment of management responsibilities under each strategy, stressing the need for interagency cooperation. (SWF)

ACC# : L001566
AUTHOR: Scott, H.D.
AFFIL : unknown
TITLE : Domestic Waste Disposal by Evapotranspiration
SOURCE: 1982 Southeastern On-Site Treatment Conference Proceedings, North Carolina Division of Health Services and the Soil Science Department, N.C. State University (4 pages)
TEXT : Presents a study to determine the feasability of ET systems as an alternative means of domestic wastewater disposal for Arkansas. A confined ET system was constructed from medium sand and tall fescue. It was monitored for one year during which the potential evaporation exceeded the rainfall by 450 mm. Computer simulations of the ET system constructed at six locations in Arkansas indicated that when realistic effluent loading rates, rainfall, surface areas, and depths were used the ET system would fail 10 months after complete vegetative cover was established. Thus, the ET system is not a viable alternative for long-term domestic waste disposal in Arkansas. (AU/SWF)

ACC# : L001567
AUTHOR: Carlile, B.L.; Messick, J.K.

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AFFIL : Extension Soil Specialist, Soil and Crop Sciences Dept., Texas A & M
        University, College Station, Texas, and Agriculture Research
        Technician, Soil Science Dept., N.C. State University, Raleigh, N.C.
TITLE : Performance of Conventional and Alternative Waste Systems Under
        Controlled Waste Loadings
SOURCE: 1982 Southeastern On-Site Treatment Conference Proceedings, North
        Carolina Division of Health Services and the Soil Science Department
        N.C. State University (6 pages)
YEAR  : 1982
TEXT  : Describes a study measuring the performance of various onsite
        wastewater system trench designs in tight soils.  Systems evaluated
        include:
                  1) conventional trench
                  2) conventional trench using SB2 pipe
                  3) conventional trench with T and J panel blocks
                  4) V-trench
                  5) V-trench lined with filter fabric and PVC distribution pipe
                     with syphon dosing

        The panel block and SB2 systems appear to function equally or only
        slightly better than the conventional system on low-percolating soils.
        The V-trench, using gravity distribution, functioned much better and
        appears to offer 40 to 50 percent greater absorption potential.
        (AU/SWF)


ACC#  : L001568
AUTHOR: Uebler, R.L.
AFFIL : Soil Specialist, Sanitation Branch, North Carolina Division of Health
        Services, Greenville, NC
TITLE : Design of Low-Pressure Pipe Wastewater Treatment Systems
SOURCE: 1982 Southeastern On-Site Sewage Treatment Conference Proceedings,
        North Carolina Division of Health Services and the Soil Science
        Department, N.C. State University (5 pages)
YEAR  : 1982
TEXT  : Discusses how low-pressure pipe dosed systems overcome soil
        limitations.  Provides a brief design example for the LPP system
        including: system layout, dosing rate determination, pump selection,
        and dosing volume.  Includes tables and figures.  (SWF)


ACC#  : L001569
AUTHOR: House, C.H.
AFFIL : Soil Science Department, N.C. State University, Raleigh, NC
TITLE : Electrical Controls for Pressure-Dosed Systems
SOURCE: 1982 Southeastern On-Site Sewage Treatment Conference Proceedings,
        North Carolina Division of Health Services and the Soil Science
        Department, N.C. State University (13 pages)
YEAR  : 1982
TEXT  : Describes the advantages and disadvantages of electrical control
        devices for pressure-dosed systems.  Figures give possible combinations
        for level control sensors, electrical dosing controls, and solenoid
        discharge controls. (SWF)


ACC#  : L001570
AUTHOR: Flowers, J.E.
AFFIL : unknown
TITLE : The Importance of Wastewater Facilities Planning in Small Communities
SOURCE: U.S. Environmental Protection Agency - Workshop on Alternative
        Wastewater Systems, October 17, 1983, Orlando, Florida (6 pages)
YEAR  : 1983
TEXT  : Discusses the problems facing small communities in constructing,
        managing, and financing wastewater treatment systems and emphasizes the
        importance planning plays in solving the problems, listing the four
        essentials in facility planning.  Provides examples of successful
        systems in Indiana, Michigan, Ohio, Minnesota, and Illinois.  (SWF)


ACC#  : L001571
AUTHOR: Steinbeck, S.J.
AFFIL : Supervisor, On-Site Sewage Program, Sanitation Branch, Environmental
        Health Section, North Carolina Division of Health Services
TITLE : Determining the Acceptability for Individual Sewage Treatment and
        Disposal Systems in North Carolina
SOURCE: 1982 Southeastern On-Site Treatment Conference Proceedings, North
        Carolina Division of Health Services and the Soil Science Department,
        N.C. State University (4 pages)
TEXT  : Explains why North Carolina has replaced percolation testing with a
        comprehensive soil evaluation procedure.  (SWF)

ACC#  : L001572
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AUTHOR: Lomax, K.M.
AFFIL : Department of Agricultural Engineering, University of Delaware, Newark, DE
TITLE : On-Site Disposal Along an Estuary
SOURCE: 1982 Southeastern On-Site Treatment Conference Proceedings, North Carolina Division of Health Services and Soil Science Department, N.C. State University (6 pages)
YEAR : 1982
TEXT : Discusses evapotranspiration systems and saturated soil disposal as alternatives to replace failing septic systems in low-land areas near estuaries. Deep trenches or bermed infiltration ponds are acceptable in terms of hydraulic response, water quality measurements, and social acceptance. (AU/SWF)

ACC# : L001573
AUTHOR: Taylor, G.L.
AFFIL : Land Treatment Specialist, Law Engineering Testing Company, Marietta, GA
TITLE : On-Site Wastewater Treatment by Spray Irrigation on Forested Slopes
SOURCE: 1982 Southeastern On-Site Treatment Conference Proceedings, North Carolina Division of Health Services and the Soil Science Department, N.C. State University (3 pages)
YEAR : 1982
TEXT : Summarizes the results of a nine-year continuing study on the renovation of wastewater applied to steep forest slopes and the extrapolation of these results to the design of a land treatment system. The combination of a reasonably high periodic wastewater loading and of lateral subsurface flow creates moisture conditions on the irrigated area and at the base of the slope that enhances high rates of denitrification. Although the forest growth is enhanced to some degree, the uptake and net storage of nutrients within a forest stand are low in the southeastern United States and play little role in the direct renovation of wastewater. (SWF)

ACC# : L001574
AUTHOR: Lampley, E.T.
AFFIL : Soil Consultant, Division of Environmental Sanitation, Tennessee Department of Public Health, Nashville, TN
SOURCE: 1982 Southeastern On-Site Treatment Conference Proceedings, North Carolina Division of Health Services and the Soil Science Department, N.C. State University (3 pages)
YEAR : 1982
TEXT : Development of state-wide sewage and soils laws and how they affect subsurface sewage disposal are discussed along with a description of duties of Tennessee's Chief Soil consultant. (SWF)

ACC# : L001575
AUTHOR: Ralph, D.J.; Vanderholm, D.H.; Lembke, W.D.
AFFIL : Agricultural Engineering Dept., University of Illinois, Urbana, IL
TITLE : Recirculating Sand Filter for Onsite Sewage Treatment in Areas with Soils Unsuitable for Seepage Fields
SOURCE: American Society of Agicultural Engineers, Paper No. 79-2587, presented at the 1979 Winter Meeting, Hyatt Regency Hotel, New Orleans, LA, Dec. 11-14, 1979 (11 pages)
YEAR : 1979
TEXT : Presents a study comparing four different types of media in a recirculating sand filter. All samples from the filters were analyzed for total and suspended solids, ammonia, organic nitrogen, and chemical oxygen demand. The four media selected were: pea gravel, medium sand, bottom ash, and a flyash-bottom ash mixture. All four types of media provided high degrees of removal. However, the pea gravel did not perform as well as the other three, containing significantly higher concentrations of the measured parameters. The paper provides filter design illustrations and graphs of suspended solids and ammonia removal. (SWF)

ACC# : L001576
AUTHOR: Cooper, B.
AFFIL : Design and Equipment Section, Project Co-Ordination Branch, Ontario Ministry of the Environment, Ontario, Canada
TITLE : Township of Temagami: One Alternative for Servicing a Northern Community
SOURCE: Environment Canada, Environmental Protection Service, Economic and Technical Review, Report EPS 3-WP-80-5, Ottawa, Ontario, Canada K1A 1C8 (10 pages)
YEAR : 1983
TEXT : Describes a northern community's solution to the search for an economical wastewater collection and treatment system. A low pressure, shallow buried, thermally insulated grinder pump pressure sewer system

with a waste stabilization pond was eventually chosen. Provides a cost comparison table of the various alternatives. Highlights factors which should be considered in any evaluation of pressure sewers vs. gravity sewers. (SWF)

Section IV

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L001537, L001562, L001570

cost-effective
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L001302, L001333, L001334, L001339, L001354, L001356,
L001359, L001469, L001489, L001494, L001507

county
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L000507, L000539, L000557, L000673, L000778, L000794,
L000935, L000941, L001199, L001488

crop
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L001301, L001308, L001328, L001423, L001465, L001540

crust
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L000690, L000693, L000811, L000880, L000904, L001158,
L001556

denitrification
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L000303, L000442, L000479, L000604, L000704, L000780,
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L001312, L001368, L001375, L001441, L001556, L001573

design

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L001530, L001537, L001541, L001543, L001552, L001553,
L001562, L001568

detergent
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developing country
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L001009, L001011, L001013, L001022, L001043, L001060,
L001103, L001109, L001181, L001219, L001283, L001297,
L001392, L001426

dewatering
L000015, L000638, L001007

digestion
L000527, L001315

disinfection
L000063, L000114, L000177, L000195, L000329, L000343,
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L001376

disposal
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L000028, L000029, L000032, L000033, L000040, L000043,
L000046, L000048, L000050, L000053, L000054, L000056,
L000057, L000058, L000060, L000066, L000067, L000070,
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L000876, L000898, L000919, L000956, L000973, L001016,
L001017, L001026, L001101, L001122, L001124, L001178,
L001185, L001220, L001311, L001337

distribution box
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distribution network
L000113, L000465, L000500, L000512, L000626, L001056,
L001094, L001118, L001159, L001247, L001255, L001314,
L001381, L001480

district
L000187, L000673, L001198, L001354, L001388

dosing
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L000780, L000789, L000856, L000880, L000890, L000918,
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L001340, L001381, L001466, L001509, L001547, L001554,
L001567, L001569

drainage
L000160, L000239, L000501, L000621, L000665, L000685,
L000764, L001057, L001091, L001174, L001197, L001312,
L001340, L001417, L001548

drip irrigation
L000962, L001218

economic
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L000399, L000433, L000457, L000461, L000462, L000583,
L000584, L000610, L000611, L000632, L000633, L000689,
L000717, L000723, L000725, L000734, L000794, L000800,
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L001132, L001137, L001210, L001211, L001336, L001338,
L001359, L001379, L001386, L001396, L001420, L001497,
L001505, L001507

education
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L001274, L001280, L001352, L001362, L001402, L001403,
L001464, L001491

efficiency
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L001463, L001464, L001479, L001519, L001538, L001560,
L001566, L001567, L001575

effluent
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L000066, L000068, L000072, L000073, L000082, L000095,
L000102, L000118, L000124, L000137, L000148, L000152,
L000153, L000155, L000158, L000159, L000164, L000171,
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L000218, L000226, L000239, L000240, L000243, L000247,
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L001515, L001544

effluent disposal
L000073, L000117, L000286, L000335, L000368, L000379,
L000408, L000465, L000485, L000501, L000550, L000558,
L000602, L000616, L000636, L000639, L000794, L000855,
L000870, L000878,

L000901, L000956, L000964, L000990, L001096, L001107,
L001203, L001205, L001213, L001241, L001256, L001296,
L001299, L001305, L001408, L001465, L001466

energy conservation
L000712, L001019, L001053, L001074, L001191, L001217,
L001245

energy requirement
L000139, L000184, L000330, L000450, L000460, L000528,
L000537, L000546, L000568, L000569, L000573, L000575,

L000587, L000616, L000618, L000637, L000652, L000712,
L000772, L000837, L000989, L000996, L001054, L001354,
L001537

enforcement
L000458, L000468, L000502, L001162, L001488

environmental effect
L000004, L000007, L000071, L000077, L000093, L000123,
L000139, L000149, L000182, L000189, L000281, L000288,
L000314, L000320, L000325, L000327, L000331, L000341,
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L000399, L000402, L000403, L000404, L000409, L000413,
L000428, L000431, L000433, L000436, L000452, L000456,
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L000680, L000707, L000816, L000874, L000970, L001034,
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L001423, L001475, L001498, L001532

ET
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L000463, L000487, L000488, L000504, L000506, L000508,
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L000858, L000863, L000870, L000878, L001001, L001107,
L001121, L001153, L001194, L001205, L001233, L001234,
L001284, L001285, L001296, L001301, L001310, L001340,
L001347, L001373, L001468, L001492, L001511, L001566,
L001572

ETA
L001340, L001414, L001467

eutrophication
L000402, L000417, L000506, L000833, L000975, L001110,
L001282, L001295

evaluation
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L000033, L000035, L000038, L000050, L000053, L000054,
L000057, L000065, L000082, L000102, L000112, L000113,
L000114, L000126, L000128, L000148, L000149, L000151,
L000159, L000165, L000166, L000167, L000168, L000171,
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L000815, L000851, L000858, L000884, L000895, L000986,
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L001310, L001358, L001406, L001427, L001456, L001466,
L001467, L001468, L001469, L001470, L001471, L001473,
L001490, L001513, L001521, L001535

evaporation
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L000232, L000248, L000283, L000286, L000408, L000430,
L000487, L000531, L000635, L000718, L001026, L001383,
L001511

excreta disposal
L000486, L000587, L000680, L000703, L000779, L000783, L000786, L000795, L000826, L000829, L000847, L000854, L000855, L000865, L000887, L000892, L000895, L000988, L001013, L001043, L001079, L001109, L001219, L001283, L001287, L001392, L001399

extended aeration
L000074, L000147, L000464, L000481, L000561, L000637, L000638, L000663, L000674, L000778, L000888, L001047, L001138, L001193, L001473, L001485, L001486, L001492

failing system
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fecal coliform
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fecal strep
L001542

federal
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fertilizer
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fill system
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financing
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L001510, L001528, L001570

fish
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fixed-film system
L000561

flow control
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L001134, L001422, L001434, L001480, L001499, L001500

flow rate
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L000722, L000812, L001480

flushing
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forest treatment
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L001305, L001324, L001380, L001465,

L001514, L001540, L001573

geology
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L001072

government
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gravity sewer
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grease
L000564

grease trap
L000248, L000651, L001035

greywater
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grinder
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grinder pump
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halogen
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health
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heavy metal
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hot climate
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housing density
L000621, L000874

human effect
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incinerating toilet
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incinerator
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individual
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L001482, L001492, L001512, L001516

multi-family
L000272, L000563, L000588, L000649, L001402

municipal
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L000992, L001514

network
L001056, L001255

nitrate
L000753, L000757, L000766, L000962, L001160, L001177,
L001223, L001225, L001311, L001312, L001313, L001343,
L001444, L001457, L001540

nitrification

L000228, L000247, L000831, L000943, L000974, L000975,
L000985, L001102, L001120, L001152, L001225, L001282,
L001368, L001441, L001559, L001561

nitrogen
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L000147, L000157, L000158, L000174, L000185, L000209,
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L001573

nutrient
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L001075, L001147, L001216, L001375, L001484, L001514,
L001526, L001538, L001550, L001556

odor control
L000946, L001287

oil flush
L000108, L000129, L000138, L000141, L000349, L000528,
L000559, L000851, L000891

on-site
L000022, L000023, L000073, L000097, L000110, L000262,
L000263, L000269, L000271, L000272, L000327, L000346,
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L001498, L001507, L001510, L001511, L001512, L001524,
L001525, L001528, L001532, L001552, L001555, L001556,
L001557, L001564, L001565, L001572

on-site alternative
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L001362, L001506, L001520, L001558

operation
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L000527, L000541, L000552, L000604, L000606, L000616,

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L001482, L001488, L001511, L001523, L001550, L001562

operator
L000276, L000471, L000476, L000813, L001517

organic loading rate
L000347, L000434, L000637, L001065

osmosis
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L000616, L000629

overland flow
L000196, L000639, L000684, L000685, L000737, L000751,
L000759, L000972, L000974, L001102, L001225, L001237,
L001375, L001393, L001529, L001540

owner-built
L000271, L000541, L000569, L000577, L000587, L000642,
L000650, L000669

oxidation ditch
L000256, L000637, L000930, L000947, L000996

oxidation pond
L000035, L000050, L000522, L000532, L000567, L000607,
L000622, L000635, L000639, L000667, L000750, L000769,
L000798, L000909, L000934, L000947, L001026, L001286,
L001472

oxidation-reduction
L000109, L000132, L000246, L000962

oxygen transfer
L001434, L001541

ozone
L000281, L000329, L000354, L000574, L000588, L000604,
L000792, L000831, L000873, L001012

O&M
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L001558

package plant
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parasite
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patent
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L000088, L000099, L000104, L000105, L000107, L000155,
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pathogen
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L001185, L001300, L001542, L001555

peat
L000917, L001021, L001218, L001484

percolation
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L001121, L001355, L001374, L001428, L001439

percolation test
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L001374, L001571

performance
L001485, L001486, L001487

permeability
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permit
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L000688, L000727, L000915, L001545

phosphorus
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L001448, L001474, L001489, L001516, L001526, L001532,
L001546, L001556, L001562

physical
L000499, L000702

physical-chemical
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L000603, L000604, L000773, L000793, L000796, L000798,
L000822, L000837, L000845, L000852, L000930, L000934,
L000940

pilot plant
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planning
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L001494, L001507, L001510, L001551, L001553

plant operation
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L000958, L001047

plastic
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L000500, L000512, L000665, L001519, L001521

plumbing code
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polishing pond
L000313, L000639, L001138

political
L000009, L000097, L000593, L000680, L001320

pollution
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L000124, L000166, L000209, L000236, L000308, L000321,
L000326, L000341, L000360, L000365, L000396, L000402,
L000452, L000455, L000514, L000689, L000698, L001026

polyelectrolyte
L000036, L000793

pond
L000926, L000928, L001541, L001576

ponding
L000053, L000465, L000591, L001509, L001548

porosity
L000591, L000615, L000621, L000643, L000764, L000959

potable
L000588, L000680, L001171

precipitation
L000412, L000487, L000710, L000896, L000991, L001046,
L001048

pressure
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pressure sewer
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L001407, L001410, L001478, L001503, L001558, L001576

pressure system
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L001255, L001314, L001381, L001429, L001458, L001466,
L001569

pretreatment
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L001007, L001069, L001281

primary treatment
L000878, L000889

privy
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L001426, L001533, L001546

proceedings
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L001389, L001524, L001525

public health
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L000886, L000903, L000941, L000956, L001003, L001112,
L001282, L001288, L001459

public participation
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L001322, L001337, L001353, L001356, L001365, L001491,
L001505, L001517, L001520, L001565

pump
L000045, L000055, L000078, L000091, L000099, L000102,
L000105, L000137, L000164, L000208, L000231, L000256,
L000266, L000268, L000286, L000440, L000505, L000530,
L000788, L000794, L001010, L001244, L001478

pumping system
L000164, L000287, L000482, L000563, L000616, L000967,
L000981, L001062, L001213, L001290, L001434

purification

L000219, L000336, L000499, L000676, L000709, L000792,
L000831, L000873, L000880, L000901, L001515

pH
L000554, L000587, L000588, L000991, L001143, L001308

rate structure
L000462, L000553, L000589, L000611, L000846

RBC
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L000896, L000958, L000989, L001307, L001346, L001394

recycle
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L000092, L000104, L000105, L000143, L000147, L000169,
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L001497, L001502, L001558, L001575

redox potential
L000053, L000228, L000962

regulation
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L000023, L000073, L000077, L000081, L000093, L000096,
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L001525, L001545, L001560, L001564, L001571, L001574

removal
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L001063, L001076, L001118, L001173, L001332, L001401,
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L001491, L001531

residential
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L000603, L000675, L000883, L001378

resource conservation
L000528, L000568, L000587, L000680, L000707, L000908

rest area
L000001, L000147, L000284, L000335, L000386, L000388,
L000416, L000754, L000868, L001235, L001310, L001374,
L001398

retention time
L000636, L000637, L001539

return flow
L000637

reuse
L000773, L000914, L000956, L001034

reverse osmosis
L000047, L000336, L000422, L000588, L000831

runoff
L000487, L000621, L000695, L000744, L001511

rural
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L000703, L000707, L000718, L000752, L000779, L000785,
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L000957, L001026, L001030, L001141, L001353, L001395,
L001396, L001420, L001447, L001494, L001528

safety
L000915, L001371

salinity
L000112, L000190, L000614, L000711

sampling
L000006, L000603, L000616, L000915, L001272, L001398

sand filter

L000015, L000040, L000055, L000065, L000090, L000118,
L000123, L000146, L000159, L000171, L000195, L000200,
L000208, L000224, L000235, L000265, L000283, L000451,
L000467, L000505, L000528, L000531, L000544, L000554,
L000558, L000559, L000578, L000604, L000613, L000628,
L000636, L000639, L000663, L000687, L000702, L000727,
L000768, L000775, L000805, L000839, L000842, L000863,
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L001026, L001031, L001140, L001151, L001152, L001153,
L001157, L001187, L001263, L001267, L001284, L001285,
L001340, L001344, L001360, L001366, L001397, L001422,
L001428, L001429, L001435, L001446, L001463, L001470,
L001471, L001484, L001492, L001502, L001507, L001515,
L001575

sanitary survey
L000557, L000874, L000980, L001337, L001398, L001477,
L001482

sanitation
L000138, L000394, L000560, L000680, L000703, L000779,
L000826, L000829, L000854, L000865, L000892, L000895,
L000929, L001013, L001022, L001103

saturated flow
L000455, L000780, L000964, L001200, L001501

scavenger
L000109

SB2
L001567

sealing
L000591, L000635, L000791

seasonal
L000023, L000253, L000254, L000404, L000480, L000555,
L000572, L000636, L000643, L000808, L000839, L000844,
L001289, L001295, L001305, L001523, L001544

secondary treatment

L000275, L000280, L000303, L000637, L000639, L000727,
L000872, L000889, L000914, L001046, L001216

sedimentation
L000498

seepage field
L000028, L000032, L000041, L000042, L000043, L000044,
L000089, L000094, L000100, L000102, L000123, L000158,
L000161, L000165, L000166, L000175, L000190, L000205,
L000207, L000217, L000218, L000223, L000235, L000243,
L000247, L000273, L000501, L000542, L000550, L000570,
L000591, L000615, L000625, L000626, L000644, L000657,
L000665, L000667, L000704, L000713, L000726, L000753,
L000777, L000820, L000840, L000856, L000857, L000863,
L000864, L000871, L000878, L000890, L000893, L000897,
L000948, L000960, L000964, L001004, L001036, L001037,
L001056, L001063, L001086, L001088, L001094, L001096,
L001121, L001154, L001155, L001158, L001174, L001193,
L001221, L001281, L001301, L001317, L001326, L001351,
L001397, L001415, L001435, L001438, L001475, L001508,
L001509, L001552, L001563

seepage pit
L000062, L000143, L000296, L000298, L000591, L000777

segregation
L000037, L000051, L000437, L000438, L001232

septage
L000015, L000015, L000025, L000026, L000034, L000052,
L000090, L000109, L000136, L000140, L000206, L000213,
L000238, L000246, L000248, L000301, L000414, L000415,
L000467, L000474, L000502, L000503, L000513, L000521,
L000531, L000574, L000600, L000638, L000640, L000725,
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L000892, L000898, L000913, L000919, L000973, L001007,
L001016, L001017, L001026, L001098, L001115, L001121,
L001122, L001128, L001167, L001220, L001241, L001251,
L001252, L001303, L001313, L001316, L001330, L001337,
L001365, L001396

septic tank
L000007, L000008, L000017, L000025, L000026, L000031,
L000034, L000040, L000041, L000043, L000044, L000045,
L000046, L000048, L000049, L000056, L000058, L000060,
L000061, L000062, L000065, L000066, L000067, L000068,
L000069, L000071, L000073, L000082, L000095, L000096,
L000109, L000111, L000112, L000113, L000114, L000116,
L000117, L000119, L000120, L000121, L000123, L000124,
L000125, L000127, L000132, L000148, L000150, L000152,
L000153, L000154, L000158, L000159, L000160, L000161,
L000163, L000167, L000171, L000172, L000183, L000187,
L000189, L000190, L000200, L000205, L000207, L000208,
L000214, L000215, L000216, L000217, L000218, L000219,
L000221, L000223, L000233, L000235, L000240, L000241,
L000243, L000245, L000246, L000253, L000255, L000260,
L000268, L000275, L000277, L000278, L000282, L000283,
L000287, L000290, L000293, L000295, L000296, L000297,
L000298, L000300, L000301, L000306, L000307, L000308,
L000314, L000317, L000318, L000320, L000321, L000331,
L000333, L000337, L000339, L000345, L000346, L000355,
L000361, L000363, L000368, L000382, L000387, L000390,
L000391, L000403, L000408, L000409, L000411, L000415,
L000417, L000418, L000419, L000428, L000431, L000432,
L000434, L000435, L000436, L000451, L000453, L000454,
L000456, L000458, L000477, L000478, L000501, L000503,
L000505, L000506, L000513, L000519, L000523, L000526,
L000533, L000538, L000539, L000540, L000544, L000554,
L000557, L000558, L000559, L000576, L000591, L000602,
L000603, L000604, L000608, L000609, L000613, L000615,
L000616, L000621, L000622, L000640, L000644, L000651,
L000657, L000663, L000667, L000680, L000687, L000711,
L000726, L000734, L000743, L000761, L000763, L000768,
L000777, L000788, L000789, L000797, L000807, L000808,
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L000923, L000940, L000948, L000960, L000967, L000970,
L000975, L000982, L000996, L001002, L001006, L001035,
L001036, L001049, L001054, L001065, L001086, L001098,
L001106, L001121, L001125, L001126, L001154, L001155,
L001167, L001168, L001182, L001207, L001240, L001241,
L001244, L001253, L001265, L001284, L001291, L001322,
L001344, L001367, L001389, L001398, L001403, L001410,
L001435, L001446, L001451, L001457, L001463, L001480,
L001503, L001508, L001509, L001512, L001522, L001557

septic tile
L000161, L000237, L000252, L000254, L000644, L000871

serial distribution
L000509, L000621, L001539

setback
L000596, L000651

sewage
L000305, L000307, L000314, L000315, L000324, L000328,
L000341, L000352, L000381, L000389, L000390, L000392,
L000395, L000397, L000523, L000618, L000619, L000691,
L000810, L000855, L000967, L001016, L001069

sewer
L000017, L000049, L000233, L000365, L000366, L000370,
L000372, L000407, L000563, L000564, L000699, L000781,
L000794, L000806, L000876, L000941, L000957, L001025,
L001085, L001090, L001283, L001302, L001521

single family
L000128, L000563, L000778

siphon
L000644

site evaluation
L000809, L000811, L001101, L001215, L001332, L001501,
L001502, L001511, L001512, L001571

site preparation
L000487, L000500, L000505, L000512, L000544, L001128

site selection

L000089, L000095, L000096, L000158, L000182, L000198,
L000221, L000222, L000233, L000235, L000236, L000273,
L000382, L000465, L000500, L000501, L000505, L000506,
L000508, L000512, L000514, L000531, L000538, L000545,
L000558, L000616, L000621, L000630, L000633, L000648,
L000651, L000664, L000681, L000685, L000690, L000701,
L000838, L000850, L000976, L001081, L001088, L001121,
L001128, L001148, L001222, L001268, L001269, L001271,
L001284, L001292, L001351, L001354, L001381, L001409,
L001414, L001429, L001438, L001447, L001455, L001456,
L001493, L001511, L001540, L001552, L001554

sizing
L000069, L000084, L000094, L000106, L000137, L000217,
L000223, L000244, L000505, L000604, L000616, L000621,
L000636, L000639, L000646, L000651, L000959, L000990,
L001036, L001088, L001215, L001310, L001351, L001415,
L001508

slope
L000501, L000616, L000621, L000651, L001397, L001406,
L001539

sludge
L000015, L000025, L000026, L000034, L000083, L000109,
L000161, L000233, L000290, L000295, L000414, L000419,
L000474, L000502, L000527, L000637, L000639, L000662,
L000681, L000691, L000725, L000731, L000788, L000888,
L000889, L000903, L000912, L000913, L000914, L000919,
L000932, L000946, L000954, L000956, L001007, L001080,
L001115, L001120, L001183, L001204, L001209, L001231,
L001277, L001311, L001312, L001319, L001324, L001328,
L001396, L001400, L001423, L001444, L001461, L001462,
L001514, L001531, L001558

sludge stabilization
L000109, L000474, L000638, L000913

small-diameter sewer
L000055, L000128, L000212, L000231, L000266, L000286,
L000420, L000423, L000424, L000425, L000441, L000558,
L000734, L000761, L000794, L000970, L000971, L001085,
L001180, L001186, L001210, L001338, L001405, L001512,
L001549

social
L000013, L000021, L000097, L000191, L000251, L000270,
L000433, L000573, L000594, L000611, L000652, L000659,
L000664, L000672, L000680, L000779, L000806, L000826,
L000854, L000912, L000980, L001137, L001396

soil
L000067, L000070, L000103, L000118, L000124, L000185,
L000205, L000207, L000209, L000221, L000222, L000228,
L000236, L000243, L000245, L000246, L000247, L000258,
L000261, L000265, L000273, L000287, L000296, L000331,
L000337, L000345, L000382, L000452, L000487, L000503,
L000507, L000510, L000524, L000526, L000530, L000531,
L000558, L000602, L000604, L000616, L000624, L000625,
L000629, L000643, L000648, L000651, L000690, L000693,
L000695, L000701, L000713, L000718, L000722, L000724,
L000753, L000767, L000768, L000782, L000820, L000838,
L000852, L000856, L000869, L000870, L000878, L000880,
L000881, L000897, L000923, L000956, L000962, L000966,
L000967, L000970, L000972, L001003, L001045, L001058,
L001069, L001071, L001072, L001082, L001161, L001178,
L001252, L001374, L001382, L001437, L001438, L001454,
L001490, L001493, L001531, L001548, L001552

soil absorption
L000008, L000042, L000044, L000048, L000057, L000058,
L000067, L000094, L000100, L000103, L000113, L000114,
L000115, L000120, L000121, L000126, L000150, L000153,
L000165, L000166, L000172, L000175, L000190, L000198,
L000199, L000203, L000214, L000218, L000219, L000221,
L000236, L000240, L000253, L000254, L000258, L000260,
L000297, L000327, L000355, L000418, L000428, L000452,
L000453, L000455, L000465, L000469, L000487, L000509,
L000519, L000526, L000531, L000591, L000596, L000621,
L000625, L000626, L000643, L000644, L000658, L000661,
L000690, L000693, L000711, L000713, L000726, L000734,
L000743, L000753, L000761, L000766, L000780, L000808,
L000811, L000814, L000824, L000842, L000850, L000860,
L000864, L000870, L000890, L000964, L000976, L000982,
L000983, L001003, L001058, L001105, L001116, L001121,
L001126, L001135, L001143, L001150, L001160, L001201,
L001213, L001215, L001222, L001228, L001229, L001261,
L001281, L001284, L001285, L001354, L001408, L001409,
L001417, L001439, L001441, L001442, L001447, L001448,
L001449, L001455, L001509, L001536, L001554, L001557,
L001561

soil characteristic
L000043, L000053, L000054, L000066, L000070, L000082,
L000086, L000115, L000122, L000145, L000198, L000207,
L000218, L000219, L000223, L000240, L000243, L000245,
L000355, L000465, L000469, L000503, L000624, L000627,
L000643, L000655, L000748, L000760, L000802, L000857,
L000901, L000921, L000938, L000966, L001072, L001127,
L001143, L001148, L001154, L001177, L001178, L001233,
L001268, L001277, L001279, L001308, L001374, L001390,
L001406, L001409, L001415, L001437, L001440, L001455,
L001466, L001504

soil classification

L000018, L000043, L000070, L000207, L000355, L000507,
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L001148, L001292, L001409, L001455, L001552, L001574

soil clogging
L000103, L000219, L000390, L000434, L000436, L000509,
L000510, L000550, L000585, L000591, L000615, L000764,
L000780, L000818, L000820, L000904, L000959, L000964,
L001057, L001069, L001072, L001096, L001151, L001158,
L001201, L001437, L001439, L001509, L001534, L001554

soil compaction
L000218

soil crusting
L000811, L000814

soil percolation test
L000073, L000501, L000531, L000538, L000591, L000616,
L000651, L000693, L000760, L000857, L000862, L000869,
L000882, L000959, L001221, L001269, L001351, L001390,
L001415, L001456

soil survey
L000196, L000198, L000221, L000503, L000809, L001071,
L001148, L001574

soil test

L000207, L000222, L000261, L000273, L000321, L000693,
L001093, L001351, L001355, L001424, L001531

soil texture
L001466

soil treatment
L000360, L000396, L000404, L000474, L000510, L000542,
L000621, L000655, L000667, L000684, L000685, L000736,
L000745, L000751, L000759, L000764, L000820, L000828,
L000918, L000938, L000943, L000951, L000967, L000975,
L000983, L001004, L001031, L001081, L001150, L001194,
L001228, L001250, L001266, L001308, L001376, L001406,
L001414, L001442, L001512, L001527, L001536, L001561

soil-impervious
L000767, L000859, L000952, L001072, L001193, L001196,
L001248, L001290, L001312, L001326, L001490

solid waste
L000083, L000288, L000426, L000575, L000587, L000691,
L000705

spray system
L000180, L000181, L000196, L000203, L000210, L000257,
L000335, L000716, L000736, L000954, L000972, L001024,
L001039, L001185, L001203, L001305, L001459, L001529

standard
L000016, L000017, L000018, L000020, L000070, L000130,
L000142, L000276, L000289, L000346, L000623, L000646,
L000840, L001453, L001485, L001486, L001487, L001513

state
L000018, L000020, L000022, L000024, L000029, L000097,
L000098, L000100, L000142, L000156, L000206, L000211,
L000242, L000249, L000261, L000262, L000263, L000269,
L000271, L000439, L000468, L000492, L000526, L000538,
L000539, L000563, L000565, L000595, L000659, L000673,

L000682, L000689, L000699, L000727, L000774, L000785,
L000806, L000941, L000957, L000965, L000970, L000998,
L001001, L001036, L001162, L001274, L001336, L001339,
L001418, L001493, L001518, L001564, L001571, L001574

statistical analysis
L000282, L000312, L000477, L000721, L000997, L001000,
L001223, L001294, L001336, L001337

subsurface disposal
L000004, L000017, L000028, L000033, L000070, L000082,
L000103, L000159, L000209, L000228, L000247, L000278,
L000279, L000390, L000432, L000487, L000499, L000507,
L000528, L000559, L000561, L000604, L000616, L000627,
L000638, L000648, L000657, L000710, L000838, L000842,
L000870, L000878, L000973, L001001, L001124, L001311,
L001454, L001518

sulfur
L000474

surface discharge
L000040, L000195, L000196, L000210, L000616, L000627,
L000636, L000718, L000858, L000939, L000973, L001001

surface disposal
L000037, L000202, L000604, L000638, L000640, L000973,
L001444

suspended solid
L000119, L000154, L000280, L000588, L000616, L000636,
L000639, L000687, L000790, L001129, L001433, L001457

suspended solids removal
L000078, L000443, L000444, L000473, L000544, L000618,
L000619, L000637, L000702, L000750, L000756, L000819,
L000839, L000909, L001309, L001369, L001375, L001470,
L001471

suspended-growth system
L000552, L000637

tile
L000665, L001174, L001417

toilet
L000002, L000037, L000092, L000104, L000107, L000108,
L000129, L000138, L000225, L000229, L000230, L000232,
L000233, L000234, L000264, L000274, L000319, L000359,
L000384, L000386, L000394, L000496, L000497, L000525,
L000526, L000528, L000551, L000569, L000580, L000581,
L000592, L000604, L000642, L000674, L000765, L000777,
L000812, L000829, L000851, L000867, L000884, L000891,
L000945, L000980, L001001, L001006, L001030, L001350,
L001392, L001427

topography
L000222, L000505

training
L000008, L000261, L000270, L000276, L000377, L001306,
L001362, L001517

transportation
L000266, L000267, L000305, L000467, L000513, L000973,
L001115, L001443, L001449, L001462, L001527

treatment
L000001, L000002, L000003, L000005, L000007, L000009,
L000015, L000016, L000017, L000018, L000021, L000023,
L000025, L000026, L000027, L000030, L000031, L000034,
L000035, L000036, L000039, L000041, L000042, L000044,
L000049, L000052, L000059, L000062, L000063, L000065,
L000069, L000070, L000072, L000074, L000075, L000076,
L000079, L000082, L000088, L000090, L000106, L000108,
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L000147, L000150, L000152, L000155, L000157, L000161,
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L000191, L000194, L000195, L000196, L000199, L000200,
L000201, L000203, L000206, L000208, L000214, L000215,
L000222, L000227, L000228, L000229, L000232, L000233,
L000237, L000240, L000244, L000250, L000256, L000257,
L000258, L000260, L000265, L000271, L000272, L000275,
L000276, L000280, L000281, L000282, L000287, L000288,
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L000334, L000339, L000340, L000341, L000349, L000353,
L000365, L000366, L000367, L000376, L000381, L000382,
L000388, L000392, L000393, L000395, L000397, L000400,
L000401, L000406, L000407, L000410, L000411, L000418,
L000421, L000422, L000429, L000433, L000437, L000442,
L000443, L000444, L000446, L000447, L000448, L000449,
L000450, L000451, L000453, L000454, L000456, L000459,
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L000473, L000474, L000476, L000478, L000479, L000480,
L000485, L000488, L000490, L000493, L000495, L000496,
L000497, L000498, L000499, L000500, L000506, L000508,
L000509, L000512, L000514, L000519, L000521, L000524,
L000527, L000528, L000547, L000549, L000558, L000560,
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2.0 collection system alternatives	L000242, L000259, L000266, L000268, L000286, L000304, L000341, L000366, L000381, L000486, L000490, L000514, L000519, L000530, L000545, L000558, L000559, L000568, L000640, L000652, L000788, L000876, L000879, L000900, L000993, L001025, L001090, L001181, L001199, L001521
2.1 small-diameter gravity sewers	L000065, L000212, L000231, L000286, L000734, L000761, L000794, L000970, L000971, L001085, L001180, L001186, L001210, L001260, L001338, L001339, L001403, L001405, L001512, L001549
2.2 pressure sewers and pressure systems	L000006, L000012, L000016, L000017, L000023, L000045, L000055, L000065, L000083, L000084, L000101, L000106, L000128, L000137, L000138, L000164, L000168, L000179, L000189, L000231, L000233, L000266, L000267, L000268, L000286, L000287, L000291, L000292, L000305, L000322, L000338, L000342, L000356, L000357, L000358, L000370, L000371, L000372, L000379, L000380, L000422, L000423, L000424, L000425, L000426, L000440, L000441, L000482, L000522, L000523, L000563, L000595, L000712, L000715, L000727, L000734, L000742, L000761, L000770, L000771, L000772, L000785, L000794, L000807, L000819, L000833, L000848, L000849, L000861, L000906, L000935, L000961, L000970, L000984, L000996, L001010, L001026, L001054, L001080, L001100, L001179, L001186, L001244, L001261, L001280, L001302, L001336, L001339, L001363, L001371, L001403, L001407, L001410, L001429, L001478, L001503, L001512, L001519, L001522, L001558, L001576
2.3 vacuum sewers and vacuum systems	L000065, L000091, L000108, L000138, L000168, L000233, L000304, L000427, L000522, L000523, L000563, L000595, L000651, L000785, L000891, L000963, L000981, L001080, L001302, L001304, L001329, L001336, L001391, L001476, L001412
2.4 holding tanks/ truck transport	L000046, L000063, L000099, L000284, L000286, L000352, L000595, L000602, L000735, L000786, L000829, L000967, L001042, L001079, L001222
3.0 treatment processes	L000255, L000257, L000261, L000265, L000273, L000275, L000276, L000281, L000286, L000287, L000290, L000311, L000312, L000323, L000341, L000348, L000359, L000366, L000369, L000381, L000392, L000393, L000397, L000421, L000433, L000437, L000471, L000472, L000473, L000478, L000479, L000489, L000490, L000498, L000502, L000506, L000508, L000510, L000514, L000515, L000516, L000517, L000518, L000521, L000524, L000526, L000530, L000531, L000541, L000545, L000557, L000558, L000559, L000565, L000568, L000577, L000588, L000593, L000603, L000604, L000621, L000635, L000640, L000658, L000718, L000725, L000788, L000829, L000841, L000868,

L000879, L000914, L000993, L001016, L001017,
L001026, L001080, L001121, L001181, L001199,
L001298

3.1 soil systems
L000001, L000004, L000007, L000008, L000010,
L000015, L000017, L000018, L000023, L000028,
L000029, L000039, L000042, L000043, L000044,
L000048, L000053, L000054, L000055, L000056,
L000057, L000058, L000060, L000065, L000066,
L000067, L000070, L000071, L000073, L000077,
L000082, L000087, L000089, L000094, L000095,
L000096, L000100, L000102, L000114, L000115,
L000117, L000118, L000122, L000123, L000124,
L000125, L000126, L000130, L000132, L000137,
L000143, L000144, L000148, L000152, L000153,
L000156, L000157, L000158, L000159, L000160,
L000161, L000162, L000163, L000165, L000166,
L000171, L000172, L000174, L000175, L000176,
L000180, L000181, L000186, L000189, L000190,
L000192, L000193, L000194, L000195, L000196,
L000198, L000220, L000222, L000224, L000225,
L000227, L000228, L000210, L000212, L000214,
L000215, L000217, L000218, L000219, L000221,
L000222, L000228, L000233, L000235, L000236,
L000237, L000239, L000241, L000242, L000243,
L000245, L000246, L000247, L000248, L000249,
L000251, L000252, L000253, L000254, L000257,
L000258, L000260, L000261, L000265, L000273,
L000275, L000277, L000278, L000279, L000280,
L000282, L000283, L000284, L000295, L000296,
L000297, L000298, L000300, L000306, L000307,
L000314, L000315, L000318, L000322, L000321,
L000325, L000327, L000328, L000335, L000337,
L000345, L000355, L000357, L000360, L000361,
L000363, L000368, L000396, L000400, L000401,
L000402, L000403, L000404, L000407, L000409,
L000411, L000414, L000415, L000417, L000418,
L000428, L000434, L000435, L000436, L000439,
L000451, L000453, L000465, L000499, L000500,
L000501, L000502, L000503, L000504, L000505,
L000508, L000509, L000510, L000512, L000519,
L000526, L000542, L000550, L000560, L000565,
L000585, L000593, L000595, L000613, L000624,
L000625, L000626, L000627, L000633, L000643,
L000657, L000685, L000713, L000718, L000722,
L000724, L000766, L000768, L000822, L000824,
L000829, L000867, L000889, L000897, L000921,
L000938, L000950, L000966, L000975, L000978,
L001001, L001090, L001142, L001155, L001161,
L001166, L001167, L001195, L001215, L001241,
L001250, L001259, L001269, L001271, L001279,
L001332, L001336, L001376, L001382, L001389,
L001408, L001428, L001432, L001437, L001447,
L001449, L001454, L001493, L001496, L001499,
L001500, L001501, L001504, L001512, L001528,
L001534, L001542, L001555, L001556, L001557

3.1.1 conventional soil absorption system (ST-SAS)
L000001, L000007, L000008, L000015, L000018,
L000023, L000029, L000032, L000039, L000042,
L000043, L000044, L000048, L000057, L000058,
L000060, L000065, L000066, L000067, L000071,
L000077, L000082, L000089, L000095, L000096,
L000100, L000102, L000111, L000112, L000113,
L000114, L000115, L000117, L000123, L000124,
L000126, L000130, L000132, L000137, L000144,
L000148, L000152, L000153, L000156, L000158,
L000159, L000161, L000162, L000163, L000165,

L000166, L000171, L000172, L000174, L000175,
L000186, L000190, L000193, L000195, L000198,
L000220, L000225, L000227, L000228, L000212,
L000215, L000217, L000218, L000219, L000221,
L000222, L000228, L000233, L000235, L000236,
L000237, L000241, L000242, L000243, L000245,
L000246, L000249, L000252, L000253, L000254,
L000258, L000260, L000265, L000273, L000275,
L000278, L000279, L000282, L000283, L000284,
L000290, L000295, L000296, L000297, L000298,
L000300, L000306, L000307, L000314, L000318,
L000322, L000321, L000325, L000327, L000328,
L000337, L000345, L000355, L000360, L000361,
L000363, L000368, L000378, L000400, L000401,
L000402, L000403, L000407, L000409, L000411,
L000414, L000415, L000416, L000417, L000418,
L000428, L000431, L000432, L000434, L000435,
L000436, L000451, L000453, L000454, L000455,
L000456, L000458, L000468, L000469, L000477,
L000485, L000499, L000501, L000504, L000507,
L000509, L000510, L000519, L000533, L000538,
L000540, L000549, L000561, L000561, L000576,
L000591, L000602, L000603, L000604, L000608,
L000609, L000613, L000616, L000621, L000624,
L000626, L000644, L000648, L000651, L000655,
L000661, L000665, L000667, L000690, L000693,
L000700, L000701, L000704, L000711, L000723,
L000726, L000734, L000743, L000753, L000761,
L000768, L000777, L000778, L000782, L000794,
L000808, L000816, L000821, L000826, L000840,
L000842, L000850, L000852, L000855, L000856,
L000857, L000858, L000859, L000860, L000863,
L000864, L000866, L000870, L000871, L000874,
L000876, L000878, L000893, L000895, L000900,
L000901, L000904, L000911, L000918, L000923,
L000935, L000948, L000959, L000960, L000964,
L000967, L000979, L000983, L001002, L001004,
L001027, L001036, L001037, L001056, L001057,
L001058, L001063, L001069, L001071, L001072,
L001073, L001086, L001088, L001093, L001096,
L001098, L001101, L001111, L001112, L001116,
L001118, L001124, L001126, L001127, L001132,
L001135, L001150, L001151, L001152, L001154,
L001157, L001158, L001163, L001177, L001188,
L001193, L001194, L001196, L001220, L001221,
L001227, L001221, L001228, L001233, L001241,
L001258, L001262, L001270, L001278, L001281,
L001284, L001317, L001322, L001327, L001343,
L001351, L001374, L001390, L001398, L001403,
L001404, L001406, L001408, L001409, L001411,
L001414, L001415, L001435, L001438, L001439,
L001440, L001442, L001448, L001455, L001475,
L001480, L001490, L001494, L001495, L001506,
L001508, L001509, L001527, L001530, L001532,
L001536, L001552, L001554, L001558, L001561,
L001567

3.1.2 dosing/
resting
systems

L000023, L000053, L000054, L000055, L000065,
L000070, L000087, L000094, L000102, L000118,
L000125, L000157, L000189, L000222, L000228,
L000273, L000278, L000283, L000287, L000335,
L000465, L000504, L000577, L000591, L000616,
L000651, L000701, L000768, L000780, L000782,
L000817, L000856, L000890, L000918, L001101,
L001159, L001196, L001221, L001213, L001243,
L001247, L001253, L001255, L001260, L001284,
L001314, L001326, L001340, L001381, L001429,

	L001435, L001439, L001466, L001502, L001547, L001548, L001554, L001569
3.1.3 fill systems a.k.a. mounds	L000010, L000056, L000245, L000247, L000265, L000275, L000284, L000287, L000500, L000504, L000512, L000536, L000701, L000768, L000775, L000777, L000840, L000842, L000858, L000863, L000880, L000882, L000901, L000937, L001075, L001076, L001082, L001101, L001111, L001132, L001149, L001159, L001173, L001197, L001234, L001247, L001264, L001268, L001284, L001290, L001338, L001340, L001357, L001378, L001414, L001416, L001422, L001435, L001438, L001452, L001458, L001482, L001494, L001506, L001516, L001522, L001558
3.1.4 curtain or underdrain systems	L000017, L000176, L000273, L000275, L000465, L000768, L000878, L001101, L001153, L001174, L001197, L001414, L001417
3.1.5 misc. soil absorption system design	L000070, L000143, L000227, L000214, L000245, L000246, L000247, L000248, L000258, L000278, L000287, L000487, L000509, L000581, L000704, L000745, L000761, L000764, L000768, L000809, L000811, L000814, L000827, L000878, L000917, L000936, L000951, L000952, L000967, L000970, L000976, L000997, L001000, L001021, L001027, L001031, L001082, L001094, L001151, L001152, L001154, L001157, L001180, L001186, L001213, L001222, L001226, L001233, L001234, L001248, L001255, L001256, L001276, L001285, L001290, L001296, L001301, L001326, L001340, L001381, L001390, L001397, L001411, L001414, L001429, L001435, L001452, L001490, L001499, L001500, L001501, L001522, L001563, L001567, L001568
3.1.6 land surface application	L000028, L000171, L000180, L000181, L000210, L000245, L000258, L000275, L000284, L000335, L000357, L000368, L000439, L000460, L000474, L000546, L000577, L000630, L000633, L000636, L000639, L000652, L000679, L000684, L000685, L000698, L000705, L000707, L000708, L000716, L000736, L000747, L000755, L000757, L000759, L000794, L000802, L000822, L000866, L000881, L000912, L000922, L000956, L001003, L001019, L001022, L001033, L001034, L001039, L001185, L001224, L001263, L001297, L001319, L001377, L001530, L001536
3.1.6.1 rapid infiltration	L000273, L000459, L000805, L000936, L000989, L001031, L001081, L001091, L001092, L001105, L001139, L001140, L001143, L001229, L001238, L001360, L001443, L001474, L001553
3.1.6.2 slow rate	L000267, L000465, L000470, L000737, L000759, L000989, L001045, L001081, L001091, L001138, L001160, L001178, L001223, L001230, L001305, L001308, L001334, L001393, L001429, L001459, L001465, L001529, L001535, L001540, L001553, L001558, L001573
3.1.6.3 overland flow	L000636, L000639, L000668, L000737, L000751, L000759, L000972, L000974, L000989, L001081, L001091, L001102, L001225, L001237, L001375, L001393, L001529, L001540, L001553, L001558

3.1.6.4 misc. systems incl. land treatment L000028, L000256, L000568, L000575, L000636, L000764, L000892, L000943, L001018, L001024, L001028, L001033, L001083, L001105, L001191, L001218, L001229, L001310, L001380, L001392, L001422, L001489, L001526, L001544

3.1.7 anaerobic pretreatment systems L000284, L000287, L000396, L000411, L000473, L000622, L000636, L000763, L000868, L000892, L000977, L001512

3.1.7.1 septic tanks L000544, L000624, L000657, L000663, L000680, L000683, L000687, L000807, L000826, L000829, L000837, L000840, L000850, L000855, L000893, L000923, L000948, L000967, L001035, L001049, L001065, L001106, L001122, L001168, L001182, L001234, L001241, L001253, L001265, L001284, L001336, L001367, L001394, L001403, L001435, L001446, L001451, L001457, L001463, L001480, L001506, L001508, L001530

3.1.7.2 other anaerobic processes L000487, L000705, L000790, L001064, L001125, L001214, L001234, L001267, L001441

3.2 aerobic processes L000001, L000005, L000035, L000039, L000040, L000049, L000050, L000055, L000065, L000070, L000072, L000073, L000088, L000100, L000106, L000108, L000110, L000122, L000139, L000146, L000155, L000171, L000176, L000183, L000195, L000196, L000221, L000224, L000224, L000226, L000227, L000228, L000235, L000239, L000244, L000248, L000265, L000275, L000276, L000280, L000281, L000286, L000287, L000289, L000293, L000299, L000302, L000313, L000316, L000328, L000332, L000334, L000335, L000340, L000347, L000351, L000364, L000365, L000379, L000388, L000395, L000400, L000401, L000410, L000444, L000447, L000448, L000451, L000464, L000466, L000471, L000473, L000479, L000480, L000481, L000487, L000498, L000505, L000509, L000515, L000516, L000517, L000518, L000526, L000529, L000552, L000561, L000565, L000576, L000593, L000607, L000613, L000614, L000615, L000616, L000617, L000622, L000621, L000627, L000628, L000630, L000634, L000637, L000649, L000698, L000727, L000763, L000766, L000767, L000813, L000819, L000867, L000868, L000872, L000875, L000876, L000889, L000892, L000977, L000985, L001001, L001098, L001513, L001528

3.2.1 lagoons L000001, L000050, L000072, L000122, L000176, L000223, L000267, L000276, L000286, L000287, L000302, L000313, L000316, L000332, L000364, L000365, L000379, L000388, L000470, L000472, L000473, L000480, L000484, L000488, L000498, L000522, L000529, L000532, L000552, L000630, L000635, L000636, L000639, L000667, L000708, L000722, L000737, L000745, L000749, L000750, L000759, L000769, L000790, L000791, L000798, L000801, L000807, L000822, L000823, L000829, L000833, L000834, L000839, L000844, L000855, L000863, L000866, L000873, L000888, L000896, L000909, L000916, L000926, L000927, L000928, L000942, L000969, L000971, L000989, L000991, L001008, L001040, L001041, L001046, L001048, L001050, L001060, L001082, L001108, L001119, L001130, L001133, L001134, L001136, L001178, L001186, L001187, L001189, L001191, L001212,

	L001226, L001245, L001257, L001309, L001318, L001349, L001359, L001369, L001387, L001433, L001434, L001472, L001488, L001506, L001523, L001530, L001539, L001541, L001543, L001559, L001560
3.2.2 suspended-growth systems	L000001, L000074, L000244, L000256, L000265, L000276, L000280, L000289, L000302, L000303, L000347, L000395, L000447, L000448, L000459, L000464, L000466, L000471, L000479, L000481, L000515, L000516, L000517, L000516, L000528, L000536, L000547, L000562, L000576, L000588, L000603, L000605, L000606, L000617, L000635, L000637, L000638, L000639, L000657, L000663, L000674, L000687, L000756, L000778, L000813, L000818, L000826, L000837, L000863, L000878, L000897, L000915, L000989, L001047, L001129, L001138, L001164, L001165, L001190, L001193, L001284, L001309, L001336, L001344, L001400, L001411, L001425, L001451, L001473, L001481, L001485, L001486, L001487, L001488, L001506, L001530, L001550
3.2.3 fixed-growth systems	L000196, L000473, L000567, L000637, L000639, L000663, L000702, L000813, L000858, L000989, L001284, L001307, L001344, L001346, L001394, L001451, L001463, L001506, L001530
3.2.4 polishing/ nutrient removal systems	L000001, L000040, L000055, L000065, L000100, L000146, L000171, L000195, L000221, L000235, L000283, L000302, L000303, L000410, L000451, L000459, L000604, L000628, L000708, L000749, L000896, L000930, L000934, L001138, L001212, L001266, L001267, L001289, L001562
3.2.5 misc. aerobic systems	L000074, L000226, L000400, L000401, L000603, L000604, L000637, L000888, L000930, L000947, L000951, L000958, L000990, L001097, L001129, L001245, L001299, L001368, L001393, L001441, L001507
3.3 physical-chemical treatment processes	L000005, L000015, L000032, L000036, L000055, L000070, L000073, L000076, L000086, L000100, L000114, L000119, L000125, L000132, L000143, L000154, L000157, L000163, L000171, L000176, L000177, L000186, L000193, L000195, L000221, L000222, L000224, L000225, L000215, L000217, L000227, L000232, L000246, L000248, L000250, L000265, L000281, L000283, L000293, L000300, L000335, L000336, L000354, L000361, L000367, L000388, L000395, L000408, L000410, L000411, L000412, L000422, L000429, L000430, L000443, L000444, L000463, L000464, L000474, L000498, L000504, L000510, L000526, L000537, L000550, L000565, L000567, L000588, L000593, L000605, L000629, L000754, L000766, L000773, L000796, L000822, L000831, L000838, L000867, L000889, L001001, L001451, L001513
3.3.1 chemical precipitation	L000005, L000055, L000100, L000143, L000176, L000186, L000193, L000221, L000222, L000232, L000239, L000283, L000335, L000408, L000430, L000463, L000488, L000499, L000504, L000576, L000599, L000621, L000649, L000652, L000702, L000789, L000798, L000896, L000934, L000940, L000991, L001046, L001048, L001183, L001216

3.3.2 sorption	L000015, L000036, L000119, L000125, L000215, L000367, L000412, L000422, L000429, L000464, L000474, L000498, L000603, L001440
3.3.3 ion exchange	L000070, L000246, L000283, L000464, L000487, L000567, L000588, L000596, L000711
3.3.4 disinfection	L000086, L000422, L000727, L000730, L000792, L000844, L000872, L000873, L000915, L000922, L000942, L001012, L001022, L001236
3.3.5 misc. P-C and combination systems	L000114, L000177, L000195, L000265, L000281, L000354, L000464, L000588, L000596, L000618, L000702, L000943
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